CW SAMPLE COPY
U
M48109UNIVMUIVYM FC88
UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
300 N ZEEB
ANN ARBOR MI 103

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices ©1980 by CW Communications, Inc.

7 February 18, 1980 $1.00 s copy; $30/year

NEWSPAPER

Wide World Photos

DP Stumps for Candidates

•In Carter Camp

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — Since the day after Thanksgiving, Carter-Mondale Presidential Committee staff members hsve been directing machines to send out "tens of thousands" of letters urging Americans to support the incumbents in the White House.

The process is called "political persuasion," and in this day and age it can only be done effectively with computers and sophisticsted high-speed printers that do everything but lick the stamps.

"Beyond sny doubt, there is no other wsy to do what we are doing," according to Glenn Cowsn, deputy director of voter contact for the committee. "The alternative would have been to make telephone calls and then give the list of 'favorsble' and 'undecided' voters to a field organization.

"The field organization would have then had two choices: either to send letters that said 'Dear Friend' in

(Continued on Page 4)

•For Kennedy Coffer

By Marguerite Zientars
CW Staff

WASHINGTON, D.C. — Democrstic Presidential challenger Sen. Edward Kennedy (D-Mass.), while still trailing President Jimmy Carter in popularity polls, is reportedly way ahead in contributions solicited by direct mail.

Carter's direct-mail staff indicated $400,000 has been raised through word processing snd direct-mail methods. In contrast, Kennedy's direct-mail efforts hsve netted about $700,000

(Continued on Page 4)

'No Thanks' Say Users of 4331s To IBM's DBMS

By Tom Henkel
CW Staff

A survey of 25 DPers that have ordered or already installed IBM 4331 CPUs with the DOS/VSE operating system found that few of those users will use IBM's DL/1-DOS/CICS data base management system (DBMS).

Five of the surveyed users plan to use the DL/1-DOS/-CICS combination. Four do not plan to use any DBMS at all; 16 either have chosen another DBMS vendor or are seriously thinking of doing so.

Poor performance and s lack of flexibility were the major reasons stated for disliking the DL/1-DOS/CICS combination. Some users pointed to more site-specific complaints; some noted IBM's DBMS lacks s report writer and others said DL/1 will not communicate with sny non-IBM DBMS.

The most uncomplimentary reports came from s Salinas, Calif.-based 4331 user who said he tried the IBM DBMS on his newly installed machine only to find it did not work. The user is also running IBM's VSE/Vsam.

The Salinas user said the IBM DBMS did not access files in the proper sequence and DL/1 did not interact with CICS or Vsam properly.

As s solution, the user switched to another vendor's DBMS, in this case Software AG's Adabas. The user also dropped Vsam, but kept CICS. The DBMS is now working up to par, he reported.

Leery of DL/1

Other users with installed 4331s — but yet-to-be installed DBMS — are leery of DL/1. They have heard of performance problems with the package, but could not go into more detail about what kinds of performance problems are allegedly occurring.

A first-time IBM user in a mainly Burroughs Corp. shop decided to take the IBM DBMS "because we wsnted to stay under the big blue wing for a while." However, the firm's DP manager is having second thoughts about DL/1.

"We may not stick with DL/1. We had some people with DL/1 experience, so the firm decided to go with that," he explained.

"DL/1 is not flexible enough to do DBMS-to-DBMS talk-

(Continued on Page 7)

Performance Analysis Tougher

Report: CICS 1.5 Has Trade-Offs

By Marcy Rosenberg
CW Staff

MARINA DEL REY, Calif. — Users are expected to embrace msny of the enhancements IBM has promised in Release 1.5 of CICS/VS, but several of the added capabilities may make it harder to analyze the performance of the widely used data communications monitor.

And although this latest CICS/VS release — not due out until May for DOS users and September for OS users — boasts expanded monitoring facilities, these will provide only data collection routines and leave to the user the burden of writing data snalysis programs for performance tuning.

Drawing these conclusions was Eric P. Emanuel, former chairman of IBM's Guide user group CICS Performance Committee, in s report issued by Candle Corp., s systems software firm for which Emanuel now does consulting work.

In Emanuel's view, the two enhancements that will most affect the design and operation of systems running under CICS will be the addition in Release 1.5 of multiregion operation and the extension of the intersystem communications capability offered in the earlier Release 1.4.

Obsolescence of FDP

CICS/VS multiregion operation will obsolete Peer Address Spaces, an IBM Field-Developed Program (FDP) currently available to CICS/-VS users. Among what Emanuel termed "serious drawbacks" to this FDP are that it lacks Vtam and Vsam support.

With multiregion operation, however, users csn run within a system multiple copies of logically connected CICS regions that will share files, terminals, transactions snd other system resources with complete transparency to the user.

In addition, an individual CICS region can be stopped, changed and restarted without interrupting the other CICS regions, Emanuel pointed out.

Facilities within multiregion operation include trsnsaction routing and function shipping plus the capability to share CICS/VS msnagement modules by placing them either in the system link pack area or in the shared virtual area. This makes storage utilization more efficient, reduces paging and increases integrity, according

(Continued on Page 6)

Bill Would Centralize Federal DP

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Legislation to creste a centralized federal office to set governmentwide information policies and oversee federal agency information management activities has been introduced in the House of Representatives.

The Paperwork Reduction Act of 1980, introduced Feb. 5 by Rep. Jack Brooks (D-Texas), calls for a high-level

(Continued on Page 8)

February 1981 Targeted For Nine-Digit Zip Code

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The U.S. Postal Service has set February 1981 as the target date for implementing its nine-digit Zip Code scheme and hopes to have available at that time magnetic tapes for updating computer files to the new postal program.

The post office plans to complete its nationwide nine-digit coding effort and assemble a data base of the new codes early next year, according to Thomas Dewey of the Postal Service's Office of Zip Code Expansion.

Dewey's office was established in January 1979 to conduct the coding operation and produce the data base. So fsr, he said, the scheme has proved successful in its first test, consisting of full coding of Wilmington, Del.

The nine-digit Zip Code, announced in September 1978 sfter a two-year study, consists of the existing five-digit codes plus four more numbers to designate individual street blocks, buildings and businesses within established

(Continued on Page 8)

COMPUTERWORLD
THE WEEKLY NEWSPAPER FOR THE COMPUTER COMMUNITY
TM reg. U.S. Pat. Off.

Editor: E. Drake Lundell Jr.
Managing Editor: Nancy French
Senior Editors: Industry: Marcia Blumenthal; Software: Mercy Rosenberg; Communications: Brad Schultz; Features: John C. Whitmarsh
Senior Writer: Communications: Phil Hirsch
Correspondents: West Coast: Jeffry Beeler; Washington, D.C.: Jake Kirchner
Staff Writers: Tom Henkel, Timothy J. Scannell, Connie Winkler, Jay Woodruff, Marguerite Zientara
Chief Copy Editor: Cheryl M. Gelb
Copy Editors: Nancy Fleming, Catherine Marenghi, Steve Milmore, Barbara T. VanScoyoc
Photography Editor: Ann Dooley
Editorial Assistants: Denise Petski, Martha Taylor
Editorial Cartoonist: Jim Orton
Contributors: Education: J. Daniel Couger; Taylor Reports: Alan Taylor; Human Connection: Jack Stone

For Sales, Circulation and Production contacts, see inside back page.

Please address all correspondence to the appropriate department at 375 Cochituate Road, Framingham, Mass. 01701. Phone: (617) 879-0700. Telex: 94-1153

OTHER EDITORIAL OFFICES:
West Coast: 407 California Avenue, Suite 10, Palo Alto, California 94306. Phone: (415) 328-8064.
Washington, D.C.: 521 National Press Building, 529 14th Street N.W., Washington, D.C. 20045. Phone: (202) 347-6718.
England: Steve Burton, IDG Publishing Ltd., 160-166 Camden Street, London NW1 9PF Phone: 01-267 1201. Telex: 851 264727.
W. Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40, Phone: (089) 34-90-61. Telex: 5213350.
Asia: Hidetsuna Sasaki, Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: J2424461.
Australia: John P. Costello, Computerworld Pty. Ltd., 3 Bruce Street, Crows Nest, NSW 2065. Phone: 929-5388. Telex: SECCO AA25468.
Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th floor 20031 Rio de Janeiro, RJ Brazil. Phone (021) 242-7395 or 263-8046. Telex: 2130836(WORD BR).

Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc. Copyright 1980 by CW Communications/Inc. All rights reserved. ISSN 127-420. Reproduction of material appearing in *Computerworld* is forbidden without written permission. Send all requests to Marion Kibbee.
$1.00 a copy: U.S. — $30 a year; Canada, Central & So. America — $50 a year; Europe and Near East — $90 a year, other foreign — $150 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

ABP MCC

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 375 Cochituate Road, Framingham, MA 01701.

Despite Outcry From Controllers

FAA Proceeding With Arts IIIA

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — The Federal Aviation Administration's (FAA) Arts IIIA air traffic control system, a hybrid of which Tampa controllers have labeled "unsafe and unreliable" [CW, Feb. 11], will be installed in 28 airports around the country by next January.

While FAA spokesman said the Arts IIIA will be "completely different" from the troublesome Tampa system, controllers claim it still has a number of bugs to be worked out.

The system is already being phased into operation in Minneapolis, Santa Ana, Dallas-Ft. Worth, Atlanta, Houston and Boston; Chicago and Los Angeles are next on the list. Arts IIIA reportedly offers quick recovery from system interruptions, but controllers contend it still presents problems that could pose danger to air travelers.

"When in use, the Arts IIIA is good equipment," acknowledged Pat Doyle, vice-president for the Professional Air Traffic Controllers Organization's (Patco) Great Lakes Region. "However, when it fails — which it does at an alarming rate [at Minneapolis] — it's no good at all."

Patco Representative Michael Fermon at Boston's Logan International Airport also reported the system fails "to often," for periods lasting "several seconds to several minutes."

System Enhancements

Arts IIIA offers such improvements over the currently used Arts III as completely digitized radar, refresh radar display, accessibility to more processor memory, a fail-soft capability and tracking of "primary" radar targets (aircraft without electronic transponders transmitting coded altitude, speed and identification data).

Based on a Univac I/O P-B an enhancement of Arts III's Univac Input/Output Processor (I/O-P) the Arts IIIA's recovery rate from system interruptions has dropped from about 27 seconds to about four seconds, according to Mike Coe, Patco facility representative at Atlanta International Airport.

"As controllers, we put an awful lot of faith and trust in the computer," Coe said, "so it's very important to us that if it fails, it recovers very quickly."

Two Problems

One problem with the system, however, is that the computer's to sometimes fails to track an airplane or sometimes tracks an airplane that is not there; another is that overlapping targets are displayed on the radarscopes, Coe said. Such symptoms have also been reported at Minneapolis, Doyle said.

"The computer people say the fault lies with our secondary radar system equipment, and our secondary radar system people tend to believe it's the computer," Coe said. "The only thing the controller knows is that the damn thing doesn't do everything people say it'll do."

The problem of overlapping targets means controllers cannot distinguish among several targets displayed simultaneously. "Any time you have a lot of clutter in a major facility area like ours and the alphanumeric data blocks overlap, you can't distinguish them," Coe said. The data blocks indicate an aircraft's flight number, airline, ground speed and altitude.

While acknowledging the benefits of the Arts IIIA, Coe recalled that the original Arts I system — which was installed first at Atlanta — at least did not have a serious problem with overlapping targets. "I don't believe we had quite as much trouble with the Arts I because we could change the individual targets' leader direction," he noted.

"The Arts III is supposed to 'surge' and move a target away from any other targets, but it doesn't do it," he added. "The targets are constantly overlapping."

Tracking Problem

As for the problem of not tracking aircraft, often "when we cross-check with an adjacent facility or Air Route Traffic Control Center, we can't see an airplane but they can," Coe stressed that the problem could lie not only with the computer, but possibly also with the radar system or beacon system.

Wherever the trouble originates, "it's an extremely dangerous situation when we can't see an airplane that's there.

"When we're expecting the computer to track an airplane and it doesn't, and unless we happen to have our attention on that particular airplane at the time the computer quits tracking it, there's the possibility of our losing that target for a short or even a long period of time," Coe said. "Of course, that can create a very hazardous situation."

Correction

In "International Treaty on Data Protection, Privacy in Limbo" [CW, Jan. 28], a reference to the Council of Ministers was erroneously changed to the Council of Europe, changing the meaning of the story.

This Week

IN DEPTH
Auditing the Integrated Data Base . . . Follows Page 50
Survivable Systems, Part 4: Survivability ID/9
Loops and Firm Foundations ID/16

NEWS
Carter Camp Mixing In-House, Outside DP 5
Grayson to Keynote Office Automation Confab 7
Nine-Digit Zip No Problem: Software Vendors 8
Ecom Issues Get Muddier in House Hearings 9
Collapsed System Suspends City Utility Billing 10
Ware Urges Standards for Federal DP Security 11
AT&T 'Premarketing' Dataphone II: IDCMA 12
Washington, D.C., Financial System in Disarray . . . 13
Wang Institute to Open Its Doors in September 14
Women in DP Call Their Lives a 'Juggling Act' 16
DP Book Bibliography Lists 250 New Entries 16
Managers on the Move 18
Politics Seen Block to Global Data Links in '80s 20
Turnaround Time 23

EDITORIAL
Editorial: Voter Manipulation? 24
Mass. DPers Now Have Avenue of Tax Relief 25
Cooperative Approach Produces Best Contracts . . 25
The Myth of Software Maintenance 25
Human Connection: What MIS Should Embrace . . . 28
Taylor Report: Datapro Results Raise Questions . . . 30

SOFTWARE & SERVICES
Report: Prepare DP Staff for Packages 31
Finance Class Gets Hands-On Experience 36
Alternative to DL/1 Out for Commercial Sites 38
Purchase Orders Tracked for CS, Eclipses 40
Credit Snags Send Batch Clothier On-Line 41

COMMUNICATIONS
Flood of Electronic Mail Offerings Seen 43
Message Switch Handles 2,000 Terminals 43
Three Carriers Agree on Packet Net Protocol 44
Nasa Working to Increase Satellite Capacity 45
ATMs Give Student Allowances 48
Field Sites Get Communications 49
Community College Installs Bar-Code Checkout . . . 50

SYSTEMS & PERIPHERALS
Users: Shortage? What Paper Shortage? 51
Drives Speed Steel Maker's Throughput 400% 53
Disk System Maker Expands Field Maintenance . . . 54
Bank Controls Static, Grounds Teller Problems . . . 55
End Users Turning to Third-Party Maintenance 56

MINIWORLD
Mid-Range Processor Expands CS Mini Family . . . 57
DEC-Based Business System Allows WP, DP 58
Broker Turns to Technology for Personal Touch . . . 59
File System Cross-References by Number, Code . . 60

COMPUTER INDUSTRY
Magnuson Moving Into Two More Markets 61
Freeze on Soviet Trade Seen Thawing 61
Telefile May Lose $2 Million 62
SSTI to Be 'Aggressive and Mean' 63
Conference Panel Calls Warc a U.S. Success 64
VDC: Demand for Winchester Disks 'Tepid' 66
Judge Expected to Rule Soon on EDS vs. Iran 67

The Romans had it.

The British had it.

And now, by George...
ADR's got it.

EMPIRE™

The most powerful and complete decision support system available.

EMPIRE puts the power of the computer at the fingertips of the decision maker. Its comprehensive yet easy to use collection of interactive facilities for data management, reporting, graphics, statistical analysis, and alternative outcome simulation enables executives without computer expertise to examine an unlimited number of strategies in any planning situation. EMPIRE allows you to keep your confidential financial information in-house and reduce outside time-sharing expenses.

EMPIRE was developed by ADR, the world's largest independent software company. ADR has installed over 10,000 of its software products at more than 6,000 sites worldwide. EMPIRE incorporates the qualities ADR traditionally builds into its software: ease of use, efficiency, dependability, and total commitment to product support. Now your decision makers can have an EMPIRE. With confidence, by George. Send for a brochure today.

APPLIED DATA RESEARCH, INC.

Attn: EMPIRE Information Center, Route 206 Center, CN-8
Princeton, New Jersey 08540, Telephone: (201) 874-9000

Carter DP Keying on 'Political Persuasion'

(Continued from Page 1)

hand-addressed envelopes, or to attempt to handwrite small, personalized letters," Cowan said. "But the impact is much greater in these circumstances to send a personalized letter."

When Cowan says "personalized," he really means "mass-produced to look personalized" — the apparent key to success in winning political and monetary support for candidates in the modern age.

And with the upcoming New England primaries on Feb. 26 (New Hampshire) and March 4 (Massachusetts), Cowan and his colleagues are sending thousands of personalized letters per day to Democratic and Independent voters in those states.

What does such a letter say? "Basically, it is a letter just thanking the supporters for their support, encouraging their continued support, reminding them when election day is and encouraging them to vote," Cowan explained.

"For the undecideds, we attempt to show them some reasons why they should support the President by indicating some stands he's taken on particular issues or some accomplishments specific to the particular state," he continued.

Using the local Automated Datatron, Inc.'s (ADI) Xerox Corp. 9700 laser printer, "we personalize all of them," produced at the rate of two per second, Cowan said. Although the system is capable of citing specific responses voters have given in telephone interviews, to date the letters have not done that.

Future Use

As for the future use of the capability, "it depends on the particular state and whether or not we feel there are more than two or three issues that are likely to be of great importance," Cowan said.

"If there are only two or three, we would include them in every letter, but if we felt there was such a gamut of issues that we had to specify, we have the capability of inserting variable-issues paragraphs in each letter, as processed by the 9700."

Renting no mailing lists from brokers as Carter's direct mail fund-raising effort does, the staff instead gets names, addresses and phone numbers from two sources: voter registration tapes and the phone books — "all very public information," Cowan noted.

The direct mail process begins by determining which names on the voter registration lists are eligible to participate in a particular situation, such as a primary or Democratic Party caucus, and narrowing the lists to include only those names, Cowan explained.

"We then target specific populations that are more likely than others to support the president, because we cannot afford to call everyone in a state," he said.

Likely Support

In determining who is most likely to support Carter, the mailers use polling data, demographic information and results from previous elections. "We will look at some previous statewide election that had similar candidates to those we're dealing with now," he explained. Finally, after telephone interviews, they send the personalized letters to committed supporters and "undecideds."

For its computing and word processing power, the committee contracts principally with three outside firms: Computer Network Corp. (Comnet), Action Data Processing, Inc. and ADI, all in the D.C. area.

ADI is principally a letter-production firm that does some software work and data manipulation functions, Cowan said. Comnet uses an IBM 370/158 and an Itel Corp. A56, which simulates IBM equipment, to receive data from the field. Comnet then supplies that data on magnetic tape to ADI for letter production.

Comnet receives name and address information from "dozens" of Texas Instruments, Inc. 765 terminals located at phone banks that are busy targeting likely supporters of Carter. Cowan would not specify the exact number because "that could be valuable information for someone."

Comnet can receive the data from all the 40K-byte memory terminals at the rate of 10,000 names a day and is working to increase the capability within a month to 30,000 a day.

Comnet then translates the data into Xerox 9700 language on magnetic tapes for future letter production, Cowan explained. Along with names and addresses are letter codes that tell the 9700 which letter form to send the individual in question.

"Once we've generated some letters, we might want to go back for a second run to pull political subdivision-specified files to then produce a 9700 driver tape, for which we use Action Data," he added.

For example, Action Data can separate from the lists certain supporters who live within a given precinct, who are of "a particular type of persuadability" or who expressed an interest in a specific issue, Cowan explained. Action Data uses an IBM 360/30.

Such capabilities are a far cry from such "old-fashioned" methods as handwritten letters, computer-generated line-printed letters, facsimile telegrams and limited-volume word processing systems, he concluded.

Kennedy Nets $700,000 by Direct Mail

(Continued from Page 1)

through similar but less sophisticated methods, according to a spokeswoman for Morris Dees, Kennedy's finance chairman.

In overall contributions, from such sources as fund-raising dinners, however, Carter leads Kennedy with $6.7 million, almost doubls Kennedy's $3.4 million.

In charge of Kennedy's direct-mail fund-raising effort is the direct-mail consulting and management firm of Craver, Matthews & Smith Co., a company that said it ideologically stands behind all of its clients, be they political or otherwise.

Ths firm deals mainly with such citizens' groups as the American Civil Liberties Union, Sierra Club, National Organization for Women, Common Cause, Hand Gun Control, National Abortion Rights League and Planned Parenthood — and has about 50 clients, noted Tom Matthews, a partner in the firm.

In ths political realm, the firm lists as clients Sen. Birch Bayh (D-Ind.), Sen. John Culver (D-Iowa), Sen. Robert Packwood (R-Ore.) and Rep. Elizabeth Holtzman (D-N.Y.). Most, but not all, of the political clients are Democratic, and all are "on the left side of the aisle," Matthews said.

Kennedy Finance Chairman Dees handled Carter's fund-raising in 1976, but only because Kennedy did not run that year. For political reasons Dees did not contract with Craver, Matthews & Smith Co. at that time.

Matthews recalled "We opposed ter then; we ran the direct mail for [Rep.] Morris Udall [D-Ariz.]."

Since starting the direct-mail campaign for Kennedy last November, Craver, Matthews & Smith has rented about 60 mailing lists from brokers. These lists include the names of subscribers to publications and contributors to various causes who would be likely to support Kennedy, Matthews explained.

A Million Letters

The only information furnished on the lists are name, address and the publication subscribed to or the organization to which the person belongs, he said, adding that the 60 lists from which mailings have been done so far have contained "a little over a million" names.

Each letter sent out is a one-shot attempt to raise funds, according to Matthews, and there are no follow-up or word-processed "personalized" letters citing previous contributions. The only way someone might receive more than one letter would be if a name appeared on more than one list.

Ths standard letter, which opens "Dear Frisnd," is "very simple and very straightforward," Matthews said. The strategy used within is "self-evident."

While Matthews could not specify the computer firms with which the company contracts for direct-mail tasks, Compac, Inc. — which maintains Carter's contributor files — also maintains some names, financial information and Federal Election Commission reporting data for the Kennedy campaign, Compac President Jim Burton said.

Compac's equipment includes an IBM 360/50 with 512K bytes of memory, two IBM 1403 printers operating at 1,100 line/min and 2.5M bytes of disk storage.

Terminals NOW!

3 Month Lease or Immediate Sale

Your single source for brand-name terminals.

Used Equipment Corner

ADDS Consul 580 only $695.

Quick . . . Quiet . . . Reliable

Call:

East: (617) 246-1665

P.O. Box 185, Lynnfield, MA 01940

West: (415) 461-0923

1100 Larkspur Landing Cir., Larkspur, CA 94939

QWIKTERM

To Track People and Money

Carter Camp Mixing In-House, Outside DP

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — Tying together and overseeing the DP functions of the Carter-Mondale Presidential Committee — fund-raising, political persuasion and otherwise — is Bill Krause, its director of information systems.

Krause, in his eighth year as a DP professional, came to his present job through the Georgia state government, where he helped develop that state's National Crime Information Center system as well as an automated court system.

While the Carter-Mondale Committee does use "approximately seven" outside DP firms for some of its needs, such as mass mailings and maintenance of Federal Election Commission data for report generation, Krause would not specify which firms. He did, however, describe his in-house installation — to an extent.

Two stand-alone Tektronix, Inc. processors with built-in disk drives and attached printers do "a good 70%" of the group's work in-house. "When it comes to mass stuff — like hundreds of thousands of letters going out — we use the outside firms," he explained.

Krause was reluctant to discuss the model numbers of his processors, and described himself as "kind of sensitive about exactly what we're using." The system "would be a lot easier to get into if [an intruder] knows what it is."

Also declining to identify his Tektronix printers with model numbers or speeds, Krause simply described them as "slow — we don't do anything that takes huge, massive processing because we have more time and manpower than we have money or a need for instant results."

Finding the Right Person

One major function of these machines is to keep track of various people and lots of money, Krause explained. His "favorite" application is a scheduling system that puts a finger on presidential "surrogates," administrative people and campaign workers who are constantly moving around the country in this politically active year.

The application, which according to Krause is working very smoothly, can sort pertinent information about a person's whereabouts by state, date or type of event. Mixed into the scheduling are names of members of a newly formed Committee of Athletes and Artists for Carter who will soon be stumping for the President.

"If we need somebody at a certain place, we can run a report to see, for example, who will be in Illinois on March 14 who could do an event for us or show up to give some support," Krause noted.

In addition to tracking Washington-based people as they move around the country, the system also functions at a state level. "We identify different key people for each state, so if we need to send somebody there we will know with whom we need to touch base according to protocol," he explained.

Other Applications

Another application Krause discussed is delegate selections. At the upcoming Democratic Convention, in-house computing power will be joined by a time-sharing system using CRT terminals on the convention floor. The group hopes to do some on-the-spot modeling and projections "to keep up with the events minute-by-minute as people change and go one way or another," he said. "Then we'll know where to target [our efforts] next."

Krause's system also maintains a full record of volunteers working for Carter, listed according to their talents and when they might be available. That list could be used, he said, to find someone "who types and who can work on Saturday afternoon," for instance.

The committee's press data (also maintained here) is "nothing but a label program" Krause said — an up-to-date mailing list for sending out press releases. The list can be sorted by geographical area or nationality (for example, Hispanic newspapers) or by a selected type of media, like broadcasting.

Coordinating With Outside Firms

Most of the Federal Election Commission financial reporting is done outside. Krause noted, but there is some expenditure-tracking going on in-house "so we can have some idea of when we're getting close to spending too much money, of who's been issued bank drafts and of which [drafts] have come back and which ones haven't."

In direct-mail campaigns, all pertinent data is kept in the system and can then be sent on tape to contractors for certain jobs. Alternatively, the DP director may authorize contractors to use data they have stored at their sites.

Presently, phone bank workers use Tektronix CRT terminals, each with 32K bytes of memory, to enter information gleaned from voters in telephone interviews. The data is stored on tape, which is then processed in-house and sorted.

"It's not superslick and fast, but it gives us control over everything ourselves so we're not dependent on outside sources for sensitive information," Krause said.

Found

The advanced
Tape Management System
that offers you more....

If you've been planning the implementation of a Tape Management System, you owe it to yourself to discover the extra benefits, security, and control offered by CA-DYNAM/T.

Our remarkable system installs easily and supports everything from DOS, DOS/VS to the advanced DOS/VSE 4300 series. It's easier than you think to increase functional capability with CA-DYNAM/T.

A winner of this year's DATAPRO Honor Roll, CA-DYNAM/T is an extremely popular system with over 1,000 users world-wide. Shouldn't you find out why? It could just be that you've "Found" the best way to manage many of your tape library problems.

CA-DYNAM/T®

HEADQUARTERS
Computer Associates Building
125 Jericho Turnpike Jericho, NY 11753

Offices in the United States, Europe, Australia, and Canada.
Distributed in 32 countries world-wide.

MAIL THE COUPON OR CALL TOLL-FREE
800-645-3003
[NY State Call: (516) 333-6700]
CANADA Call: (416) 842-2110

Member Software Industry Association

COMPUTER ASSOCIATES
125 Jericho Turnpike, Jericho, NY 11753
YES! Send FREE information on CA-DYNAM/T
Name
Title
Company
Address
City State Zip
Phone CPU OPSYS

Also send info. on:
☐ CA-SORT High Performance Sorting
☐ CA-DYNAM/D Disk Space Management
☐ CA-DYNAM/FI File Independence Facility
☐ CA-SARL Flexible Report Writer
☐ CA-SOLVE Symbolic COBOL Debugger
☐ CA-JASPER+ Job Accounting/Reporting
☐ CA-DRIVER Job Management System

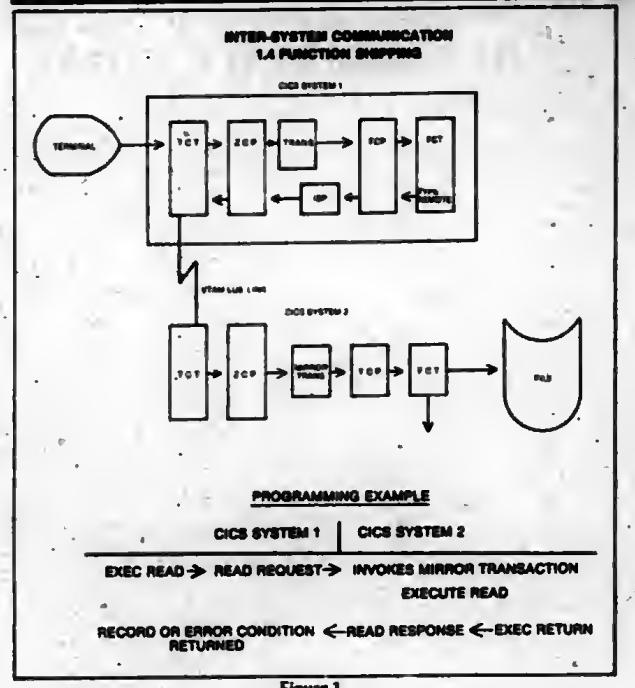


Figure 1

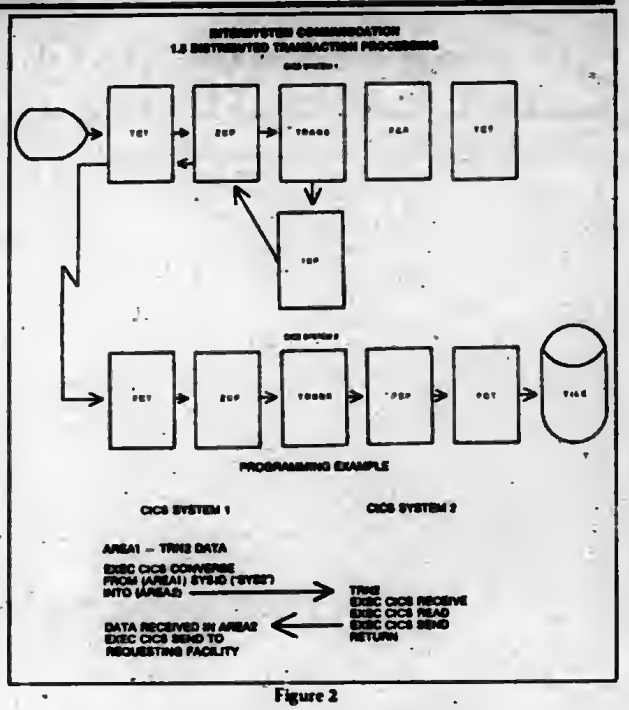


Figure 2

Report Pinpoints CICS 1.4, 1.5 Trade-Offs

(Continued from Page 1)

to Emanuel.

For example, users running multiple CICS systems independently will be able to use one as a test system and another as a production system. For departmental separation, one system can run a payroll information application while a second can run order entry.

The function shipping facility allows users from one CICS region to access data in another region, Emanuel explained. He added that file control table entries can limit multiregion accessing — for example, by setting up a transaction running in one CICS system to retrieve but not update data on a file in a second CICS system.

With transaction routing, a user in one region can invoke a transaction to execute in another region to balance and optimize CICS system resources across CICS/VS regions. As an example, Emanuel noted that a terminal normally attached to one CICS system can start a task in a different system, detach before the task is complete and so place transaction control with the second system.

Intersystem Communications

Turning to intersystem communications, Emanual said Release 1.5 adds a distributed transaction processing capability that partially improves on the use of function shipping in Release 1.4 for handling direct communications between CICS/VS transactions.

However, while distributed transaction processing offers several advantages over function shipping, Emanuel noted the trade-off lies in the degree of user involvement required for each.

Function shipping (see Figure 1) requires no specialized user programming for most applications, he said, but is limited in that control of the task stays in the originating system. As a result, the originating task must be active throughout the life of the transaction in the remote system, since all error recovery is done in the originating system.

With distributed transaction processing (see Figure 2), users reportedly can write an application as two complementary transactions, one executing in the same system as the originating terminal and the other executing in a remote system. This balances the application load between systems in an intersystem communications network, Emanuel observed.

Data transfer also is more efficient than through function shipping, where one message is transmitted over the Vtam link from system to system for each data record. Because the Vtam link is heavily used, bottlenecks, especially in file-browse situations, can occur, he explained.

By comparison, distributed transaction processing permits each message to include several data records. And since error handling can be performed in the remote system, the Vtam link between systems is freed for other applications.

Here's the Rub

The rub, though, is that distributed transaction processing requires special complementary programming commands, while function shipping can be used in Release 1.5 with little modification to existing applications in 1.4. Hence, distributed transaction processing calls for more user involvement.

With that facility, existing programs need heavy modifications because of the interactions required between transactions on different systems. Comparing figures 1 and 2 points up some of the differences between distributed transaction processing and function shipping.

Figure 1 shows a read request through 1.4 function shipping. The request goes through the terminal control table (TCT) to the terminal control program (ZCP) to initiate a transaction that then issues a file control request.

The file control program interrogates the file control table, discovers the request is a TYPE-REMOTE and routes the request to the other system via the Intersystem Communications Program (ISP).

The Figure 1 programming example shows the application program in CICS System 1 executes a READ which, through file control table specifications, invokes the mirror transaction (READ) in CICS System 2. The information then passes back through an EXEC RETURN command, CICS System 1 reads the response and handles either the data or an error condition.

In Figure 2, a file request through CICS 1.5 distributed transaction processing also goes through TCT and ZCP to invoke the user application program, but here the user must specify whether a remote transaction is to be invoked. Control is then passed back to ZCP with the appropriate transaction in CICS System 2 running independently of System 1.

Emanuel stressed that it is the user — not system programming parameters — that determines whether the intersystem communications facility should be used with CICS 1.5 distributed transaction processing.

Good News, Bad News

The good news is that CICS 1.5 will support the ACF/Vtam Release 2 parallel sessions facility, which allows CICS users to run a number of concurrent sessions through the Vtam link between systems.

The bad news is that concurrent sessions reduce automatic recovery capabilities, Emanuel explained. This means that if a message is not received through the ACF/Vtam parallel sessions facility, the whole message must be sent again, leaving the application program to check for errors.

IBM is reportedly working on automatic recovery support in this area, but whether the problem will be remedied by the time CICS 1.5 is released to the general public is unknown.

"The CICS 1.5 Report," which examines other aspects of the release, costs $5 from Candle Corp., Suite 401, 4676 Admirality Way, Marina del Rey, Calif. 90291.

★★★★★★★★★★★
Terrific VALUE! 'Til Gone
Centronics 102A $995
Teletype KSR35 $395
Diablo: 1620-3 Adds: 980
DEC: 6012, 6040 IMSI: 1240-7
IBM: LA30, LA36, LA38, LS120, VT05, VT50, VT20, RT02
Delta Data: 5200 BPR: 2470
G.E.: 300KSR, 300RO, 1200RO
IBM: 3275-2, 735, 2741, 5471
Silvertit: TE318, TC485 "New"
Teletype: 33, 35, 37 ASR/KSR
T.I.: 742, 743, 745, 755RO, 765
Centronics: 101A, 103, 330, 530
Tektronix: 4023, 4601, 4632
Hazeltine 2000 SPECIAL:
H2000 Editing CRT $795
Dual Cassette 295
Thermal Printer 295
1-DAY SHIPMENT!
Call 617-391-1100
AMERICAN USED COMPUTER

Grayson to Keynote Office Automation Confab

ATLANTA — If the U.S. expects to increase its industrial productivity, its managers are going to have to board the technology bandwagon.

In fact, managers are in greater need of improvement than blue-collar workers when it comes to productivity, according to Dr. C. Jackson Grayson, keynote speaker for the first annual Office Automation Conference. The conference is slated for March 3-5 at the Georgia World Congress Center and is being sponsored by the American Federation of Information Processing Societies (Afips).

Grayson, an economist and former dean of the Business School at Southern Methodist University, will address the conference on opportunities for productivity growth through office automation technology. He now leads the American Productivity Center in Houston.

Grayson said the professional and managerial sector of the economy spends nearly 70% of its time seeking or giving information. "The future will see the need to integrate office automation technology for more productive ways to seek and use this information," he suggested.

"In the past, many managers have thought that they were exempt from technology, assigning its acceptance to production, secretarial staff and data processing," he observed.

Grayson will speak at what organizers call "the first educational forum for the exposition of concepts and technology that constitute the office of the coming decades." The conference will cover basic precepts of office automation, explore current and future technology and set the stage for future development of the industry, organizers said.

It also features a series of luncheon workshops which will propose practical solutions to office problems in such areas as insurance, engineering, banking and law. This augments a conference schedule of more than 50 seminars, tutorials, panels and special events with a "how-to" approach to office automation, according to planners.

Speakers will cover topics such as insurance, banking, engineering and library information systems; using an office process language; measuring productivity; doing an office systems feasibility study; and time management and standards.

The luncheon costs $8. Organizers also released a list of costs for other parts of the conference: full conference and proceedings digest, $75; student attendance without digest, $10; exhibits for three days, $30; one-day exhibits, $10; and one-day program and exhibits, $30.

More information may be obtained from Afips at 1815 No. Lynn St., Arlington, Va. 22209.

Users Say 'No' To IBM DBMS

(Continued from Page 1)

ing with the Burroughs system," he added and went on to say DL/1 "lacks sophistication." He has not yet looked at other vendors' offerings, however, and does not know if there is another available package that could provide the DBMS-to-DBMS "talking" for which he is searching.

Another user with a 4331 has yet to install a DBMS, but said IBM's offering probably won't be his choice. That user mentioned as likely candidates Adabas along with Cincom Systems, Inc.'s Total and Mathmatica, Inc.'s Ramis II.

Currently running Dbomp, the user said he would choose DL/1 over other vendors' packages only if IBM is the only vendor offering a bridge program linking Dbomp with the DBMS. Switching to another vendor's package may be a rough conversion, the user said.

No Decision Yet

A recent *Computerworld* survey of 15 4300 users planning on running DOS/VSE showed three plan to use the DL/1 DBMS [CW, Feb. 11]. Users in that survey said they favor other vendor's DBMS packages, but the 15 polled did not offer a clear consensus of a favorite vendor.

Since the 4300 series is just starting to make its appearance at end-user sites — a reasonably large base of 4331s is installed but relatively few 4341s have been delivered — most 4331 users contacted by *Computerworld* for its survey have not gotten around to addressing the issue of a DBMS. Most said they are still trying to make the conversion from DOS/VS to DOS/VSE, a conversion many characterized as a laborious but not a devastating process.

Asked if DL/1 is in their plans, those users told of rumored performance problems on the package, but none could specify what those problems were. Most, however, said they plan to look at other vendors' packages before making a DBMS decision.

One user, although not thrilled with IBM's offering, said he is more wary of other vendors' packages. Planning to install DL/1 on a 4331 in the second quarter, the DP manager of that Minneapolis-based firm said, "Other vendors may be good, but I don't think we can get support here from other vendors. With IBM, if our systems engineer is not available there's always someone else." The user said he had not heard of problems with DL/1.

If you'd rather measure programs by performance than by the yard, you need OPTIMIZER III. More than 1,000 OS and DOS/VS sites are now using OPTIMIZER III to stack productivity in their favor. An independent Productivity Survey reports:

- 27% improvement in overall productivity
- Testing time reduced by 25%
- 24% reduction in debugging time

Capex Corporation
4125 North 14th Street
Phoenix, AZ 85014

Tell me more about OPTIMIZER III and send the Productivity Survey.

OS ____ DOS/VS ____

NAME ____
TITLE ____
COMPANY ____
ADDRESS ____ CITY ____
STATE ____ ZIP ____ PHONE ____
A2

This powerful productivity tool will increase the reliability of your programs, better utilize production time, dramatically reduce testing and debugging. Send for the Productivity Survey and see how OPTIMIZER III stacks productivity in your favor. Mail coupon or call us at (602) 264-7241. We'll help make your programs stack up.

capex CORPORATION

Helping business do business better.

Atlanta (404) 451-8415 • Boston (617) 329-6170 • Chicago (312) 986-8618 • Houston (713) 480-8555 • Los Angeles (213) 862-5102 • New York (201) 472-7000 • European Headquarters: Amsterdam (020) 46-15-56 • Other offices in Dusseldorf, Paris, London.

Nine Digits No Problem: Software Vendors

By Jay Woodruff
CW Staff

Moving from a five-digit to a nine-digit Zip Code should not present users with any serious difficulties, even though it could mean a time-consuming job for some, five software vendors contacted by *Computerworld* indicated last week.

"Unless people have set up their systems so it is hard to modify fields [containing the five-digit code], it does not appear that they will have a difficult time of it," an IBM spokesman said.

Another software vendor agreed the switch to nine digits is "no big deal," but said it does mean a very time-consuming conversion for large firms.

"You have to change the master file programs' field size, and every report has to be redefined. That wouldn't be a big thing if you didn't have a lot of programs, but some firms have hundreds," John Robinson, senior vice-president of payroll marketing for General Computer Services, Inc. of Huntsville, Ala., pointed out.

The larger code presents no problem for Cyborg Systems, Inc.'s software. "We use a 25-position field for city and state and a five-position field for the Zip Code. By trimming the city and state to a maximum of 21 positions, we have four positions left over in the field for the four additional Zip Code digits," a spokesman explained.

However, users of software with the city and state in separate fields would not be able to make the change as easily, he added.

A Walnut Creek, Calif., software vendor has already converted its software's major files to accommodate the nine-digit code, but has not done any "detailed work" on how to make the change in software already in the field. Generally, according to Kathy Urbelis, head of product development, Integral Systems, Inc. expects to author a one-time conversion that will run against existing table-driven files.

"We'll have to convert current records to expand to a nine-digit field, then change the data table to tell it that the field is now nine digits," Urbelis said.

A spokesman for Management Science America, Inc. (MSA) said his firm uses a lot of standardized software. A user can address one area of a program and reach all other areas that are set up under the same standards, reducing the time it takes to access Zip Code fields which appear through many programs.

"It will require work, but it won't be difficult to make the change," the spokesman concluded.

Although MSA "was not happy" to hear of the change to nine digits, it appreciated learning well in advance that it was coming. "We found out about it in mid-1978, so we had the time we needed to prepare for its introduction in 1981. Some laws go into effect four days after we hear about them," the spokesman said.

February 1981 Set for Larger Zip Codes

(Continued from Page 1)

postal zones [CW, Oct. 2, 1978].

The Postal Service hopes the new codes will enhance opportunities for automating mail sorting and estimates that, with the new codes, seven employees will be able to do the sorting work now requiring 20 persons.

Dewey said several types of optical character recognition (OCR) equipment are being tested, including machinery made by ITT and Bell, Toshiba and AEG Telefunken, Inc. The OCR readers, similar to equipment already in use in Canada and Great Britain, will read the new Zip Codes and apply a bar code to the lower right-hand corner of each incoming envelope. The mail will then be sorted at local post offices by a bar reader.

DPers' Reactions

While the Postal Service looks for increased productivity, lower mail sorting costs and an opportunity to hold down rising postal rates, the nine-digit Zip Code has caused something of a stir in the DP community.

DP installations face a number of bothersome and time-consuming changes in implementing the new program, including wholesale expansion of data files, rewriting of numerous programs, revamping job control procedures, restructuring data entry and printing formats and obtaining new coding forms.

The Postal Service is not unsympathetic to these problems. "Obviously we're aware of the magnitude of what's involved for a customer," Dewey said. Some people, he continued, "are going to look on it as a very expensive proposition, and maybe they're not going to be too interested in updating their files just on the basis that in the long run it's going to hold down postal costs."

Compliance Not Mandatory

If it is any consolation to DP managers who are pulling their hair at the prospect of hundreds of hours of file conversions, the Postal Service notes that the nine-digit Zip Codes are not mandatory, and the service does not expect rapid, across-the-board compliance with the new scheme.

According to Ronald Vandegrift, general manager of the Sales Division of the Postal Service's Customer Service Department, the Post Office hopes to have approximately 80% compliance by 1985. Presently 97% of all mail posted carries a five-digit Zip Code.

As successful as the five-digit scheme has been, it took a long time to catch on, Vandegrift noted. But "when it was introduced in 1963, we weren't in the technology state that we are now. We would expect to be able to move faster [with the nine-digit program] given large systems conversions."

Once the national data base of new Zip Codes is completed, the Postal Service will assist in those systems conversions by making magnetic tapes available for major customers. "We haven't created the mechanism or even finalized the format yet of what these tapes will be," Dewey said, but predicted that 800- 1,600- and 6,250 bit/-in. nine-track tapes would be produced.

Bill Would Centralize DP

(Continued from Page 1)

Office of Federal Information Policy in the Office of Management and Budget (OMB) that would have responsibility for all government information practices.

In addition, each federal agency would designate a "senior official," reporting directly to the agency head, who would "systematically inventory its major information systems and periodically review its information management activities" as well as monitor agency compliance with the directives of the new OMB information policy office.

In opening hearings on the bill Feb. 7 before his Subcommittee on Legislation and National Security, Brooks said "this legislation is the result of a growing concern by the Congress and the President that something must be done to improve the way the government collects, uses and disseminates information."

Envisioned Functions

As envisioned in the legislation, H.R. 6410, the new OMB office would, among other things, set policies, standards and guidelines for DP and telecommunications functions and activities; work with the General Services Administration (GSA) to advise agencies on the acquisition and use of DP and telecommunications equipment and services; review agency activities in those areas; and promote automation "to improve the effectiveness of the use and dissemination of data in the operation of federal programs."

The bill, which embraces recommendations of the Commission on Federal Paperwork and the President's Federal Data Processing Reorganization Project, also directs the proposed office to:

- "Develop a program to enforce federal information processing standards, particularly language standards, at all federal installations and revitalize the standards development program, separating it from peripheral technical assistance functions and directing it to the most productive areas."
- Develop uniform information policies and practices to reduce the paperwork burden imposed on the public by federal laws and regulations.
- Increase the availability and accuracy of federal information, while reducing duplication of agency reporting requirements.
- Promote greater agency information sharing.
- Oversee federal agency compliance with the Privacy Act of 1974 in the collection, maintenance, use and dissemination of personal information.

OMB has already moved to consolidate many of these activities in one office [CW, Jan. 29], but U.S. Comptroller General Elmer B. Staats told the Brooks Subcommittee that while the OMB move is "a positive step, we do not believe . . . it negates in any way the need for this legislation."

Without the legislation, "fragmented policy and oversight responsibilities will continue and badly needed changes in federal information management controls will not be effected."

Consolidating those responsibilities, as called for in the bill, and the projected funding of $8 million for the first year of the new office's existence "will greatly strengthen the hand of OMB," he said.

Relating the legislation to the recommendations of the President's DP reorganization project, Philip J. Kiviat, who headed one of the project's task forces, told the subcommittee that "the bill takes the critically important step of explicitly assigning tasks and deadlines to the Office of Information Policy and to the agencies."

IBM 5110

CPA General Ledger/ Payroll

Distributors Wanted

IBM will help you sell it.
It almost installs itself

End User Licenses
Also Available

IRMC INFORMATION RESOURCES MANAGEMENT CORPORATION
P.O. Box 3155
Los Angeles, California 90051
Telephone: (213) 628-9846

Postal Service's Role Debated

Ecom Issues Get Muddier in House Hearings

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The debate over the U.S. Postal Service's proposed Electronic Computer-Originated Mail (Ecom) service became mired in a semantic swamp last week as two hearings before a House of Representatives subcommittee attempted to make the issue crystal clear.

"We did not foreclose the possibility of an electronic transmission system controlled by the Postal Service at some future time, assuming the Postal Service obtains the necessary regulatory approvals," Postal Rate Commission Chairman A. Lee Fritschler told the Subcommittee on Postal Personnel and Modernization on Feb. 6. He was referring to a recommendation concerning Ecom that the commission issued last December (CW, Dec. 24).

A week after Fritschler's appearance, commission member James H. Duffy told the same subcommittee that the December recommendation "forbids the Postal Service from offering electronic mail service to the public and excludes the Postal Service from contracting for or participating in the electronic transmission of mail."

Mass Mailers' Service

Ecom is designed for credit card companies, department stores, public utilities and other firms which must mail large quantities of customer statements and similar money-related documents on a regular basis. The messages would be transmitted on-line from each sender's site to serving post offices (SPO) in the nation's 25 largest cities. At an SPO, each message would be converted to hard copy and placed in an envelope; within two days after arriving at the SPO, the message would be delivered by a mail carrier.

In 1978, the Postal Service signed an exclusive contract with Western Union Telegraph Co. to transmit Ecom messages to each SPO from the telegraph company's Middletown, Va., Infomaster switching center (Ecom customers would employ dial-up or leased lines, at their own expense, to connect their sites with Middletown. Last December, however, the contract was terminated, for by then it had become apparent that the original Ecom plan was unlikely to be implemented.

One obstacle was the Federal Communications Commission (FCC), which earlier had told the Postal Service it would have to become a common carrier if it wanted to offer a "bundled" Ecom service — one that encompassed on-line message transmission. Vendors of electronic message services (EMS), meanwhile, launched a major attack on Ecom at the Postal Rate Commission — an advisory body to the Postal Service governors which, by law, must consider all new postal rate and mail classification proposals (Ecom is one of the latter). Postal Rate Commission recommendations are not binding on the Postal Service, but they generally carry considerable weight.

Last Dec. 17, the Postal Rate Commission decided by a 3-2 vote that the post office should confine itself to converting Ecom messages into hard-copy form at the SPOs and then delivering these letters; transmission, said the commission, should be performed independently by common carriers, at least until the Postal Service can work out an accommodation with the FCC.

This is the decision the Postal Service governors are now considering. They may decide what to do this week, although the matter has come up at the last two meetings without being resolved.

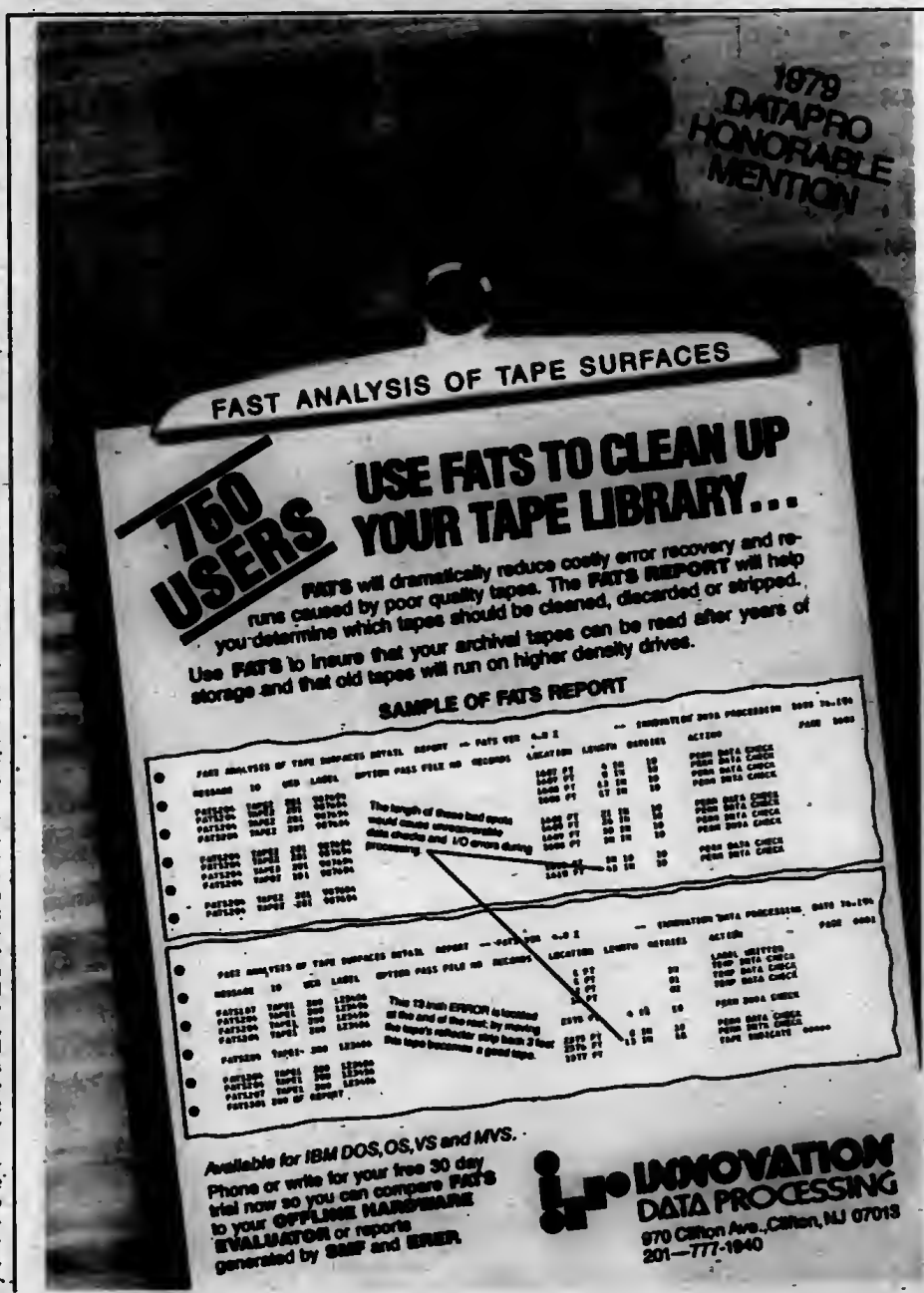
Significant Comment

Since last December, the governors have been bombarded with advice from a number of sources — including the Carter Administration, the Computer & Communications Industry Association and the National Association of Letter Carriers, among others. The recent hearing conducted by the House Subcommittee on Postal Personnel and Modernization was a continuation of this lobbying process.

Possibly the most significant comment made during the hearings came from Postal Rate Commission member James H. Duffy, who cast one of the two negative votes last December. "It is absurd to create a system, as the majority has proposed, over which neither the Postal Service nor anyone else has control and which can be abandoned at will by the common carriers, Duffy said. A contractual relationship for message transmission is vital to ensure that the service will come into existence; that it will continue to exist; that someone has responsibility for it; that service standards will be met; that nationwide service will be provided; and that the sanctity and privacy of the mail will be ensured from the time of transmission until delivery to the recipient."

Duffy added that "the data processing equipment [at the SPO] could sit and rust if the common carriers find it more advantageous to transmit messages to their own receiving terminals.

The majority decision said very little about where the buck will stop if its proposal for an unbundled Ecom service is implemented and messages fail to get through as quickly as promised.



Collapsed System Suspends City Utility Billing

By Jeffry Beeler
CW West Coast Bureau

MOUNTAIN VIEW, Calif. — The collapse of this city's 15-year-old computing system has forced its user to suspend its utility-billing operations for the last four months.

During that time, the total value of the city's unprocessed— and therefore uncollected — utility bills has grown to an estimated $110,000, according to municipal DP manager Virgil Adair.

The last gasp for the community's long-time billing system, built around an NCR Corp. Model 500 processor, came last October after months of sputtering and faltering.

Members of the municipal DP staff here had long foreseen the system's demise and had sought to avoid an interruption of computing services by converting their billing programs from the NCR 500 to a more modern configuration build around a 1M-byte Hewlett-Packard Co. Model 3000.

But the old hardware broke down sooner than they had expected and, because of staff shortages and unexpected personnel turnover, the city's DP department overshot its August 1979 deadline for completing the billing-system conversion. In fact, as of Feb. 4, the conversion was still at least several days from completion, Adair said.

Billing Holiday

So between last October and the first week of February, the 60,000 or 65 residents of this Silicon Valley community have received their municipal utilities free of charge, all because the city has had no method of computing and printing their bills.

But all signs suggest the city's billing holiday is about to end. With luck, the last of the community's billing programs will have been converted from the NCR 500 to the HP 3000 by about mid-February. At that point, Adair said, the city's billing operations will resume, and local residents will begin receiving their overdue bills — all in one lump sum.

Adair expects the community will have eliminated its entire backlog of unpaid utility bills within about two months after its program conversion is completed.

The reason for the billing-system conversion can be traced to the city's dissatisfaction with its old NCR 500. "We had had the system since 1968, and it was simply beginning to wear out," Adair recalled.

Of particular concern to the city was the inefficiency of the old system's input/output unit, which used ledger cards for reading and writing raw account data like customer name and address, date of last billing, last amount paid and previous meter reading.

"When we updated a ledger card during a billing and later tried to read the data we had just written, we found we couldn't do it," Adair said. "So we'd have to start over again and go through the tedious process of rebuilding the data on that card."

As the performance of the ledger-card read/write unit steadily deteriorated, members of the municipal DP staff found they were having to spend more of their time rewriting unreadable data than doing the city's utility billing.

Eventually, the burden of wasted effort began to take its toll, and by last August the city had already fallen three months behind in its billing schedule, Adair said. Two months later, the backlog had become so serious the municipal DP staff decided to halt its billing operations temporarily so it could devote full time to systems development.

When the conversion to the new HP 3000 system is complete, the city plans to scrap its old NCR 500, Adair said.

Sound familiar? If your programming department's like most, chances are you're spending as much as 80% of your time on programming maintenance. And enjoying it even less.

To solve this problem, we've developed DCD II Automatic COBOL Documentation System.

DCD II offers a number of important features for the programming department interested in saving manpower and increasing productivity.

First of all, DCD II automatically generates all of the documentation a programmer or analyst needs in order to understand either an individual COBOL program . . . or a complete system. And DCD II supports all versions of COBOL.*

Further, DCD II documents how each data element in an individual COBOL program is used, by whom and where. What's more, it provides for the tracing of program CALLs, PERFORMed paragraphs and branch logic.

Most importantly, all of this data is placed where it will do the most good . . . directly on the program listing next to the data element or program logic that's being described.

With DCD II, therefore, you don't have to waste valuable time searching for, gathering and collating data.

What's more, DCD II allows you to increase productivity while guaranteeing current, accurate program documentation.

In short, this time tested program documentation tool — which is presently in use in over 300 DP operations nationwide — can save you up to 50% or more on your program maintenance costs.

If you'd like to learn more about how DCD II can put time to work for you — or to learn about our "PAC/MASTER" DASD Management System — simply drop us a line. Or, better yet, call us direct at (301) 948-9600.

DCD II . . . the Best Thing That's Happened for Programmers Since COBOL.

*Including IBM OS/MFT/MVT/VS1/VS2/MVS; IBM DOS, DOS/VS, Univac 1100 Series; and Honeywell/GCOS.

cga SOFTWARE PRODUCTS GROUP
1370 Piccard Drive, Rockville MD. 20850
Phone: (301) 948-9600

Send for a FREE blow up poster of Charlie.

Plato Improves Reading Skills

SAN ANTONIO, Texas — Johnny may not be able to read, but he sure can use a computer. Teachers here at the Knox Elementary School are hoping students' rapport with computers will teach them sorely needed skills.

Using Control Data Corp.'s Plato computer-assisted instruction program, Knox Elementary teachers have been improving students' reading levels in remedial classes.

"We are teaching remedial reading to 64 children in the fourth and fifth grades under a federally funded program for underachievers," school principal Sylvia Santos said.

Four Plato terminals were installed last January as a supplementary program for remedial reading. Not all Knox's 120 students use the program. The 64 students using the terminals come mainly from Spanish-speaking homes and hear English only at school.

With the Plato program, students are showing "immediate improvement in both achievement and attitude," Santos said.

The Knox system uses four Plato terminals connected to a CDC Cyber mainframe in Arden Hills, Minn. Another school in the San Antonio school district, Douglass Elementary School, also uses four Plato terminals connected to the same mainframe. The Cyber monitors each child's progress and leads him through reading, math or language arts, depending on each student's individual needs.

The San Antonio Independent School District is one of 15 districts in the greater San Antonio area.

Says NBS Should Take Lead

Ware Urges Standards for Federal DP Security

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The National Bureau of Standards (NBS) should complete the work it began with the Data Encryption Standard and develop technical standards for instituting comprehensive computer security programs in all federal agencies, according to Rand Corp. Vice-President Willis Ware.

All DP managers must recognize the need for security even if their shops do not process sensitive information because computers are now "the lifeblood" of large organizations, such as federal agencies, Ware told a gathering of government DPers here last week.

A member of Rand's corporate research staff, Ware was a major contributor to the work of the Privacy Protection Study Commission. His talk last Tuesday covered various aspects of security and privacy and their effects on government agencies and industry.

Federal Agencies Lagging

The federal civilian agencies are understandably behind the defense agencies in implementing computer security programs, Ware noted and suggested that one central source of direction is needed to bring the various departments in line with up-to-date security practices.

Private industry, by comparison, has moved more rapidly in this area even though "it took a few fires, a few bombings and a few sprinklers that went off inappropriately" to spur them to action.

This is not to say, he continued, that federal agencies have not recognized the need for computer security. "I regard the Privacy Act of 1974 as a blessing in disguise," Ware said, because agencies, forced to protect the confidentiality of information in their data banks, had to reevaluate their computer systems and recordkeeping practices.

However, he continued, "I don't see any organizational structure that can cause all those agencies to march to the same drummer on security."

Need for 'Central Agent'

Ware praised the Office of Management and Budget for instituting guidelines for agency data security programs, but said there is need for one respository of technical assistance and information to which agencies can turn in implementing those programs.

"In government there aren't all that many options for a central agent" of this kind, he said. Because the NBS Institute for Computer Sciences and Technology (ICST) is charged with assisting federal organizations in all aspects of computer operations, ICST is a likely candidate for taking the lead in providing needed technical information on security.

Referring to ICST development of the Data Encryption Standard, Ware said it "ought to finish that job and tidy up the rest of the security matters." If NBS "would step out smartly" on this issue and produce federal information-processing standards for security, all agencies would be forced to fall in line.

Such standards would also result in vendors offering hardware and software that comply with these mandatory security specifications, he added.

Future Dangers

Looking to the future, Ware argued that advances in computer applications will necessitate corresponding advances in security techniques.

Protecting centralized data bases and ensuring the integrity of telecommunications has already been accomplished, he said, but not much thought has been given to protecting the "data pools" or "data puddles" created in distributed systems as bits of information are moved about the country for one-time processing, updating or error correction.

But if there is any one, overriding danger to society because of lax computer security and privacy safeguards, Ware said it is that there is no comprehensive discussion of the issues.

Future troubles involving recordkeeping practices will come, he predicted, not from a Big Brother type of computer abuse but from a proliferation of small, contradictory policy decisions, all of which seemed good at the moment they were made. However, over a period of time their inconsistency and incompatibility can lead to degradations of personal privacy.

'Composite Drift'

"It will be some composite drift toward an onfortunate future that has to be protected against," according to Ware. Congress, he said, debates regulating networks — such as the Federal Bureau of Investigation's National Crime Information Center — but has not started to grapple with what kind of policies should be advocated.

"I don't know where we stand as a country on all these information-based issues," Ware concluded, but went on to express optimism nevertheless about the long-term outlook. There will be more and more congressmen, Capitol Hill staffers and agency officials who possess a "high information IQ," he said, and a lot of these issues will be taken care of "simply because they are second nature" to the upcoming generation of decision makers.

Personal Computing Raises Thorny Privacy Issues

WASHINGTON, D.C. — Of all the technological trends raising thorny issues of privacy, security and government regulation, personal computing may prove to be one of the most troublesome, according to Rand Corp.'s Willis Ware.

Addressing an interagency group of federal DPers here last week, Ware predicted personal computing will be "the CB radio of the future," making possible "all kinds of mischief."

In the long run, however, the public growth in computer knowledge that personal computing will foster will be highly beneficial to the U.S. increasingly automated society, he added.

In the short term, how will Congress deal with the regulatory questions raised when networks set up by personal computing buffs compete with the Postal Service? Ware wondered.

And what will happen when those buffs join in networks with radio buffs, a situation that will arise in the amateur arena as surely as computer and telecommunications technologies have already merged to the regulatory dismay of the Federal Communications Commission?

Surely there will also be "computer blue-box freaks," he said. If electronic hobbyists can steal long-distance telephone time from AT&T, they can certainly learn how to take telephone-based data bases for a free ride.

Public Awareness

But a number of very big pluses will come of all this, Ware was quick to add. As millions turn to personal computing, a higher public information IQ will result — a trend of great importance as government and private institutions continue their migration to almost total reliance on computers.

A government based on computer power cannot realistically expect informed citizen feedback if the public is ignorant of how computers work, Ware noted.

"We're surrounded by recordkeeping systems we have to interact with," he said. It is necessary to know how to deal with computer systems in order to challenge them when necessary to protect privacy, economy and humanity.

Seminar on DDP Set in Phoenix Next Month

PHOENIX — Honeywell, Inc. is offering a five-day seminar on distributed data processing (DDP) here March 17-21.

Aimed at senior systems analysts, DP consultants and middle management personnel involved with information networks, the seminar will present a top-down approach to information networks, and the distributed environment.

The seminar will use a product-independent frame of reference, Honeywell said.

Classes of networks will be examined and presented in terms of the various types of nodes and their interconnections with DDP and distributed data bases, Honeywell said.

The seminar costs $675 including registration, documentation and five lunches, Honeywell said from its registrar's office, Honeywell System Sciences, P.O. Box 6000 (M.S. T60), Phoenix, Ariz. 85005.

Ohio Scientific: The leader in Winchester based microcomputers.

Ohio Scientific produced the first Winchester based microcomputer in 1977. Since then, we have shipped more of these systems than the rest of the industry combined. Among them are our C3-B and our C3-C microcomputers.

The C3-C. 23 Megabytes. Under $10,000.
The C3-C computer has been designed and engineered to fill the void that existed between floppy disk systems and larger hard disk systems.

In its normal configuration, the C3-C includes the Challenger III processors, 52K RAM, the 23 Megabyte Winchester drive and dual floppy drives for file system back up. And the cost is less than $10,000.

The CPU employs three microprocessors, the 6502, the Z-80 and the 6800. And the processor bus has been designed so new, more powerful micros (like 16 bit CPU's) can be added to the system later on.

There are also 10 open slots in the basic C3-C. The system supports up to 768K bytes of memory, in a multi user configuration.

The C3-B. 74 Megabytes. Under $13,000.
For those who require even more hard disk storage, Ohio Scientific offers another microcomputer in the C3 Series, the C3-B. Its specifications are the same as those of the C3-C. However, the C3-B offers a 74 Megabyte Winchester drive.

For those who do not need hard disk capacity now, but in all probability will need it in the future, Ohio Scientific offers the C3-A. It is like the C3-B and the C3-C in all respects but two. 48K RAM is standard in the C3-A, and a offers 12 open slots. When more storage is needed, the C3-A is easily expandable to either a 23 Megabyte or 74 Megabyte hard disk system. The C3-A is priced at less than $8,000.

For literature and the name of your local dealer, CALL 1-800-321-6068 TOLL FREE.

1333 SOUTH CHILLICOTHE ROAD
AURORA, OH 44202 • (216) 831-5600

AT&T 'Premarketing' Dataphone II: IDCMA

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — A major battle began shaping up at the Federal Communications Commission (FCC) last week over AT&T's proposed Dataphone II, a troubleshooting service for private-line networks.

The key issue is whether the phone company has been "premarketing" the service, thereby discouraging data communications users from acquiring similar, already developed systems manufactured by others.

Promotion of Dataphone II began many months ago. By last October, tariffs had been filed in 39 states. That month, an interstate version of Dataphone II was formally unveiled at the Information and Management Exposition and Conference in New York [CW, Oct. 22].

On Oct. 26, an interstate tariff covering Dataphone II was filed at the FCC. The tariff is scheduled to become effective Feb. 29, even though AT&T has announced that first shipments of Dataphone II hardware will be delayed until some time after that date.

The delay was announced last month [CW, Jan. 28]. Because the "complexity of the system" was "underestimated," AT&T said, first shipments would slip one to three months.

"Case for Tariff Rejection"

The latest development came earlier this month, when the Independent Data Communications Manufacturers Association (IDCMA), which represents many of the companies that make systems competing directly with Dataphone II, angrily denounced AT&T for allegedly premarketing Dataphone II.

In a petition to the FCC, IDCMA argued that if the pending tariff "is not rejected, AT&T, by its own admission, will be unable to comply with Section 201 of the Communications Act, which requires carriers to offer services to users upon reasonable request."

Although AT&T has "asserted that Feb. 29, 1980 is the effective date of Dataphone II service," IDCMA said, the January announcement "demonstrates that this date is a total nullity . . . None of the tariff provisions, charges, or regulations will have any applicability on Feb. 29, 1980. No orders will be processed, no delivery dates will be quoted and no equipment will be installed on that date. In short, AT&T has admitted that nothing will become 'effective' on that date . . . Rarely has the commission been presented with a clearer case for tariff rejection."

The association's major allegation, however, is that AT&T knew some time ago it would not be able to deliver Dataphone II hardware on the date promised, but said nothing and continued to promote the service.

Last October, when AT&T submitted its tariff application for the proposed service to the FCC, the company included cost support material which, according to IDCMA, indicated "that Dataphone II equipment items would not be available in commercial quantities on the effective date of the tariff." The association raised this point at the time by asking the phone company to reaffirm that it would be able to offer the service when promised. This request was refused, in effect.

However, the announcement in January that shipments would be delayed "confirms IDCMA's well-founded suspicions," the association said in its latest petition.

Revised Dates

Originally, AT&T said it would begin shipping Dataphone II hardware in February and March of this year. The system includes four modems — the 2024A, 2048A, 2048C and 2096A — plus a network controller and diagnostic console.

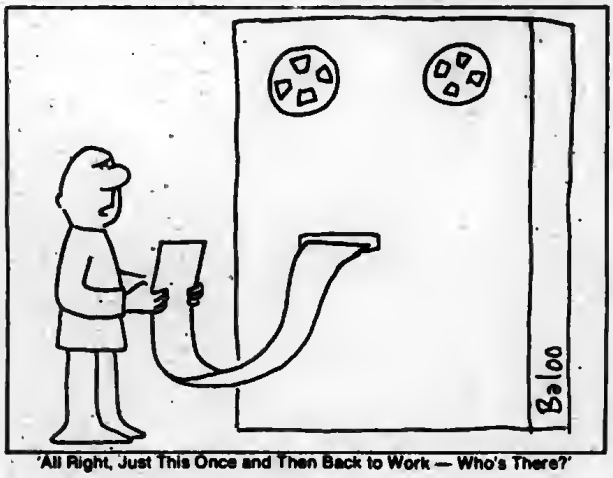
According to the phone company, the 2024A and 2048A modems, which were originally scheduled for shipment this month, will now be shipped in March and May, respectively. First shipments of the 2048C and 2096A modems, originally scheduled for March, will now take place in May and June, respectively.

The network controller and the diagnostic console, which AT&T planned to ship this month, will not be available until March.

IDCMA told the FCC the delay is likely to be considerably greater than indicated above, however. The association pointed out that the new dates represent only the beginning of shipments, not the general availability of each product, and AT&T admitted in January that it's "production buildup," subsequent to the first shipments, would be more gradual than originally planned.

This "more gradual controlled introduction program is necessary to allow for the detection and correction of unforeseen problems before large numbers of systems are placed in service," AT&T added.

The phone company did not say how long the "detection and correction" period would last, but did estimate how many units of Dataphone II components it expects to produce by the end of this year. IDCMA, after comparing this data with similar figures submitted last October with the original tariff petition, concluded that the quantities AT&T plans to ship in 1980 have been reduced 69% to 75% and the phone company's "more gradual introduction program" will "extend into 1981 for many Dataphone II equipment items."



'All Right, Just This Once and Then Back to Work — Who's There?'

Seminars to Eye Performance

SAN FRANCISCO — A seminar on capacity planning will be held here March 10-12 so participants can determine what impact work load additions will have on a system's performance. It is planned by the Technology Transfer Institute.

A second seminar will be held in Chicago April 21-23 to offer "practical, reliable and cost-effective tools" to analysts who want to estimate and appraise a new system's ability to handle present and future work loads.

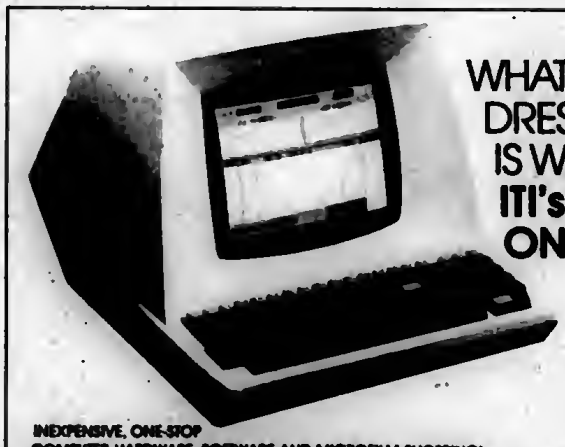
The cost for each seminar is $675. The institute can be reached at P.O. Box 49765, Los Angeles, Calif. 90049.

Course to Probe 1100 Productivity

WASHINGTON, D.C. — Users of Univac 1100 mainframes can take a five-day course here that describes tools and techniques to improve the performance and productivity of their large-scale systems. The course is being offered by Applied Educational Services (AES).

The April 21-25 course will show how to use accounting systems and software and hardware monitors to diagnose performance problems on the 1100. It will also show how to set up and organize a performance management program.

Tuition is $695, which includes several hundred pages of course notes. Reservation forms and information can be obtained from AES, 5222 Dunleigh Drive, Burke, Va. 22015.



WHAT THE WELL DRESSED COMPUTER IS WEARING...
ITI's TELEVIDEO TVI-920B
ONLY $845 ($995 LIST)

- 24 x 80 character display
- Line & character-insert/delete
- Editing keys
- 96 ASCII displayable character set
- Programmable reversable video
- Cursor addressing
- Dual intensity
- Microprocessor controlled
- Available with second-page memory
- and much more

INEXPENSIVE, ONE-STOP COMPUTER HARDWARE, SOFTWARE AND MICROFILM SHOPPING!

iTi
information technology, inc.
VISA
• New York (212) 930-9945 • Houston, TX (713) 799-0730
• Manchester, NH (603) 668-5977

Software and Hardware Headaches

Washington, D.C., Financial System in Disarray

By Tim Scannell
CW Staff

WASHINGTON, D.C. — Although designed to straighten out the city's ailing and outdated accounting methods, the District of Columbia's four-and-a-half-month-old automated financial management system has already created a number of hardware- and software-based headaches. And relief could be more than a year away, according to one city official.

Operational since last October, the system is responsible for a multitude of administrative delays, financial mistakes and work slowdowns. For instance, in December the system neglected to send some $11 million in municipal withholding taxes to the U.S. government.

In addition, scores of workers contracted by the city have waited months for checks while an undertrained financial staff figures out how to get needed data into the complicated system.

To compound matters, the system is down about 50% of the time and has very slow response times when it is running, day-to-day users of the computer have claimed.

"The system is infinitely more demanding and sophisticated than what we were doing before," Colin F.S. Walters, assistant city administrator for financial management, stated. And for the most part, "we've had to make this great leap on the basis of some rather scanty and superficial training."

Designed and installed by American Management Systems, Inc. (AMS) and paid for with federal funds, the system consists of two IBM 370/165s with a combined total of about 12M bytes of memory. The system also has around 200 CRT terminals scattered throughout the city's departments.

The DC computer system is patterned after a similar financial package installed by AMS in New York in mid-1977. However, there is where the similarities end. While the Big Apple's computer is working fairly well with a few minor problems, DC's system is plagued with a variety of troubles.

Software Snags

The principle problem area is in the system's software, in particular a disbursements subsystem that is supposed to keep track of and pay for contracted workers or services. Because of subsystem malfunctions, city workers have had to write out payment checks by hand, avoiding the help of the computers which have already gobbled up $20 million of $38 million in congressional appropriations.

To further complicate things, the system is supported by IBM IMS software which "has proved to be susceptible to unexpected mishaps" and frequently knocks the whole financial network down at unexpected times, Walters pointed out.

IBM people are currently working to iron out their half of the system's problems, but the IMS seems to be constantly running afoul of AMS' financial management software, he added.

The second major problem lies with the staff of several thousand employees who are significantly undertrained and unfamiliar with the workings of the system.

Although AMS provided some on-the-job training, the city has had to contract the University of the District of Columbia and Urban Academy, Inc. of New York to help fill in the educational gaps. The latter firm is especially beneficial since it supplied the training and manuals for the New York financial management project, Walters said.

As if software problems were not enough, the system has also been harassed by quite a few hardware difficulties. I/O channels have occasionally broken down, telecommunications facilities have failed and terminals have ceased to function when the mainframes are operating fine, Walters noted.

"I don't know whether our hardware will prove adequate in the long run," the assistant city administrator observed, although he admitted that he wasn't ready to scrap the system.

Future Pitfalls

Finally, Walters claimed that a potential problem looming in the future exists in D.C.'s inability to attract additional and qualified systems analysis programming people — a difficulty plaguing most government agencies because of current pay scales and opportunities.

"We're finding it very hard to equip ourselves as a team that is good enough to maintain this thing," he said, referring to the operation of the system.

On the bright side, however, Walters noted that the system is "cranking along" and the city just completed its first computerized balance sheet audit.

The financial management system was mandated by a federal agency called the Temporary Commission on Financial Oversight of the District of Columbia when the city assumed limited home rule powers in 1975. Designed to simplify the auditor's task, the automated system keeps track of the city's annual $1.5 billion budget.

Meet Bob Loughlin, Vice President, Career Counseling CPI

"I WANT YOU TO CONSIDER ME AS ONE RESOURCE FOR RECRUITING NEW PROGRAMMERS"

I represent Computer Processing Institute, the largest independently owned data processing school in the country. We've been training qualified data processors for the last 15 years, and placing more than 90% of them with over 400 companies who have never paid us a fee. Our graduates are working in Chicago, Dallas, Atlanta, Boston and virtually all of New England. But even as established as CPI is, there's still a possibility that you've never heard of us. And just as sure as you're reading this ad, I know that you need good programmers, and that's exactly what I have. Top quality programmers that won't cost you a fee. Sound like I'm worth trying? Why not call me or write for more information. I'll even include a copy of our course outline so you'll know what my people know. And don't forget, when it comes to placing our programmers, we're priceless.

Bob Loughlin
Computer Processing Institute
111 Ash Street
East Hartford, CT 06108
(203) 528-9211

Send me more information
Name
Title
Co.
Address
City/State
Phone

cpi

OUR PROGRAMMERS LEARN
COBOL • OS • DOS • ASSEMBLER • RPG
STRUCTURED PROGRAMMING • DUMP READING & MORE...

WHEN IT COMES TO PLACING OUR PROGRAMMERS, WE'RE PRICELESS!

Wang Institute to Open Its Doors in September

By Marcia Blumenthal
CW Staff

LOWELL, Mass. — The information sciences industry created a new industrial revolution, but the talent needed to direct that revolution is in short supply — a fact that has long appalled Dr. An Wang, chairman and president of Wang Laboratories, Inc.

To alleviate the shortage, Wang decided to form the Wang Institute of Graduate Studies, which will open its doors in September.

Although the institute will be a fully accredited graduate school, Dean Ugo O. Gagliardi considers its program unique: The program is geared to the needs of industry.

"Traditional university programs ignore the issue of how you get large bodies of people organized to develop software products. The business of developing a large software project is not even considered in university curricula," Gagliardi noted.

The Wang Institute will not offer the traditional university-based program, which often attracts students primarily interested in teaching. Instead, it is aiming to train software engineers eager to work for computer industry vendors.

CW Photo by M. Blumenthal

Shown left to right are Jack R. Bohlen, Dr. Ugo Gagliardi, Dr. Caroline Wardle and Dr. An Wang.

The initial course emphasis will be on operating system design, but will be expanded to include applications design within the next few years, Gagliardi said. At that time, the fledgling institute will begin to accept systems designers from sophisticated user organizations.

To blend the institute's academic and industry perspectives, Gagliardi is now recruiting professors with a background in both disciplines. "We will pay faculty industry-competitive salaries. People you would want to hire to teach state-of-the-art [techniques] are already working in industry," he pointed out.

The institute intends to have three full-time faculty members by September, Associate Dean Dr. Caroline Wardle said.

Practicing what he preaches, Gagliardi is currently on leave from Harvard University where he is a Gordon McKay professor of the Practice of Computer Engineering. He also worked in industry for many years; one of his positions was as technical director for the development of Honeywell, Inc.'s Series 60 equipment.

Entrance Requirements

Rather than start an undergraduate program, the institute opted for a graduate program. The most significant industry need is for first-line supervisors, project leaders and software architects, Gagliardi said, so a bachelor's degree is assumed. Summing up the institute's program, Gagliardi called it a "professional master's degree program."

Students seeking entrance to the program will be required to have a background in computer science, engineering, mathematics or some related field and the equivalent of two years' work experience. The institute will accept the equivalent of 30 to 40 full-time students for its first academic year.

However, since 85% of the first year's students will continue to work while studying, Gagliardi estimated, about 60 students will actually be enrolled in the program.

Working students will attend the institute two half-days per week for two years including summers. Full-time students can complete the program in 12 months.

Tuition is $5,600 annually, but the cost of educating one student is about $20,000, Gagliardi said, explaining the difference will be made up through the school's endowment. The Wang family endowed the institute with a $3 million bequest last year.

The institute's initial curriculum includes 11 three-credit courses, including such core courses as programming methodology, software engineering and the application of formal methods to software development. A grounding in management sciences will also be given.

Three electives will provide students with the chance to specialize in areas such as compilers and data base systems.

A two-semester project will replace the traditional master's thesis. Vendor companies in many cases will be supplying these projects for students.

Multivendor Atmosphere

Moreover, Gagliardi stressed, students will have an abundant opportunity to interact with systems: "Access to computer power will be as natural as getting a drink of water." The institute plans to have one terminal for every two students.

Right now the institute is soliciting vendors to donate equipment. "We want our computing capability to be multivendor," Gagliardi emphasized. "We don't want people trained exclusively on any one system."

In developing its objectives, the Wang Institute has put together a nine-member advisory committee made up of individuals from both academia and industry. And this month the institute is meeting with representatives from 25 to 30 vendors and user companies interested in learning more about the program, according to Jack R. Bohlen, vice-president of the institute.

The institute's facility, which will be ready in May, will be located in a bucolic 200-acre setting in Tyngsboro, Mass., the former site of a Marist Brothers seminary.

More information about its program is available from the Wang Institute of Graduate Studies at One Industrial Avenue, Lowell, Mass. 01851.

IMS EDUCATION

Adequate IMS Education is essential to the successful development of any IMS application. Finding adequate education has proven a major stumbling block to many companies. It is for this reason that many industry leaders have turned to Data Base Management, Inc., (DBMI) for IMS Education. Courses are being offered this Spring in Houston, Chicago, San Francisco, and Washington, D.C. and are also available for in-house presentation at your facility.

DBMI DATA BASE MANAGEMENT, INC.
281 Hartford Turnpike
Vernon, CT 06066
(203) 646-3264

☐ Please send information regarding the Spring offerings
☐ Please send information regarding in-house offerings
Name _____ Title _____
Company _____ Phone _____
Address _____
City _____ State _____ Zip _____

EVER TRY TO SQUEEZE 132-COLUMN PRINTER DATA INTO AN 80-COLUMN DISPLAY?

SOFTPRINT

LDC

Minis, Micros To Be Explored

NORCROSS, Ga. — The American Institute of Industrial Engineers (AIIE) will sponsor a seminar in Atlanta on May 9-10 dealing with the basics of minicomputer and microcomputer operations as well as the limitations and costs of small business computer systems.

Designed for managers who need an overall knowledge of small computers, "Mini-Micro Computers — What Every Manager Wants to Know" will present a variety of speakers who will discuss how they manage their hardware and software applications and handle manpower and other resources.

Speakers will include Vincent Rauzino, director of marketing and consulting for Datapro, Inc.; John W. Sims, supervisor of systems development for Marathon Oil Corp.; and Sylvia Hartstein, a management consultant with Booz, Allen & Hamilton.

The registration costs $250 for AIIE members and $290 for non-members. Additional details are available from the group at 25 Technology Park/Atlanta, Norcross, Ga. 30092.

Six good reasons

why MSA is first in application software.

Wouldn't you like to join a team of young professionals in a company that's grown 42% a year in the last six years? A company that knows people are the key to its success and rewards them for outstanding performances with good salaries, semi-annual bonuses, and an outstanding benefits package.

As an important part of the rapidly expanding software industry, MSA has openings for outstanding data processing individuals to work in four areas:

Applications Development - MSA's top flight technical staff uses COBOL, structured design, structured programming, and structured walk-through techniques to develop new software applications and to enhance present systems for use on IBM OS/DOS systems and other major mainframes.

Database/Data Communications/System Programming Support - MSA operates a multisystem data center doing developmental work using MVS, VM, OS/VS1, and DOS/VSE, and is involved in leading edge technology on IMS DB/DC, DOS/DL1, CICS, DATACOM, ADABAS, TOTAL, AND IDMS.

Sales/Sales Support - MSA regional and district offices market MSA products throughout the United States and the world. We offer tremendous growth and income opportunities for proven sales representatives and application specialists in all regions.

Account Management and Customer Service/Consulting - MSA's customer service goal is to keep all users of MSA systems completely satisfied with their system through continual training, communication, and problem solving. To meet this aim, MSA needs individuals who are qualified in accounting, data processing, training or software installation.

MSA is headquartered in Atlanta - a cosmopolitan environment with beautiful weather and excellent recreational opportunities. Atlanta's thriving business environment has had a great impact on MSA philosophies and MSA's quality staff is an important part of the Atlanta business community. In addition, MSA's worldwide customer base offers opportunities in many domestic offices and around the world in the customer support and sales areas.

Become an important part of an important organization. MSA. If you have successfully demonstrated your abilities in any of the areas mentioned above and are serious about a career with an innovative, fast-moving company we would like to hear from you. Please send your resume to Van Treadaway, MSA, Inc., 3445 Peachtree Road, N.E., Atlanta, Georgia 30326. All resumes will be kept in complete confidence.

An Equal Opportunity Employer M/F

MSA

Atlanta • Albuquerque • Boston • Chicago • Columbus, OH • Dallas • Houston • Los Angeles • New York • Philadelphia • San Francisco • Seattle
Washington, D.C. • Brussels • Calgary • London • Montreal • Sydney • Toronto

CWR280

Women in DP Call Their Lives a 'Juggling Act'

By Connie Winkler
CW Staff

NEW YORK — For women in data processing, life can be a kind of juggling act, and a snapshot of their lives emerged at a meeting sponsored by Women in Data Processing here recently.

About 150 women and a few men heard five women say they truly enjoy their DP jobs, but the long and unpredictable hours made the juggling act more difficult.

For Susan E.K.A. Fleischhacker, a senior systems analyst at American Can Co., her job meant being hunted down on a movie date when her system went down.

"It's difficult for people outside DP to understand the hours you are required to keep and the problems," Molly Nemhouser, a senior systems analyst with Mocatta Metals agreed. She acknowledged she spent more time at her job when first joining a company, but then leveled off and went back to other aspects of her life, which currently include working on an M.B.A. and playing tennis regularly to break the tension in her life. She is now single.

"Women in data processing tend to put in more hours," said Nancy R. Jordan. "They feel more dedicated as they look ahead because they don't see many other women." Jordan, formerly with IBM, is now a vice-president at Citibank in domestic money transfer computer services. She is married with no children.

'Have to Be Superwomen'

"Too many of us think we have to be superwomen and that no one else should share our problems," said Christine M. Millen, who moderated the session. Millen is now a senior manager of management advisory services for Price, Waterhouse & Co.

Women struggle and juggle their lives and careers in obvious ways, but also in subtle ways, Millen said. They also contend with mental guilt and pressures from other people.

Finding a balance between jobs and personal lives is a struggle for all the women, they indicated. Mary Lynn McCaffery, who manages a systems staff at Citibank, places a high priority on spending time with her children. In fact, she took six years off from her career when they were very young. "There are trade-offs," McCaffery said. "You have to recognize what your values are."

Juggling is always a question of fixing priorities. "When there seems to be no time left, but there is something you want, it will get done," Nemhouser said. "You see in two weeks what got left behind."

Priorities change day to day, Millen added. "Don't feel guilty because one day it's a sick child, another day it's a business trip. And, don't feel guilty because you change your priorities," she advised.

Millen, who is now single with two children, copes with the juggling act with the aid of a live-in housekeeper.

All the women reported feeling guilty about housecleaning; several have cleaning help.

"We have been socialized to be good housekeepers. We want to be social women — to be able to do everything ourselves without depending on other people," Nemhouser said. "I now devote my time to things that will further me in my career."

Men who live alone don't feel guilty about having a housekeeper, Jordan said.

To ensure that they and their mates don't become "ships passing in the night"— to use their words — the women arrange for at least weekly dates with their mates. Fleischhacker even makes it a dress-up date.

And the women watch out for themselves. Millen suggested the word "selfish," but McCaffery recommended "self-interesting."

"You have to take care of yourself or you are not going to be prepared to take care of anyone else," McCaffery said. She recalled the resentment she felt building when she was at home but wanted to go back to work full-time.

Steals Four Circuit Boards

Thief Disables Brain Scanner

By Jeffry Beeler
CW West Coast Bureau

PALO ALTO, Calif. — Patient care in the Stanford University Medical Center's Radiology Department ground to a halt for almost 12 hours earlier this month when a thief posing as a service engineer swiped four circuit boards from the CPU controlling the department's brain scanner.

The loss of the two processor boards and two memory boards brought both the scanner and its associated Data General Corp. Eclipse S/200 to a standstill until hospital staffers found temporary replacement parts at a General Electric Co. warehouse in nearby Mountain View.

Staff members returned the borrowed boards when permanent replacement parts arrived from a Data General plant in Westboro, Mass., according to Norman Briggs, administrator of the Radiology Department's Diagnostic Division.

The interruption in scanning operations caused no serious health care problems.

The theft occurred sometime during the early morning hours of Feb. 6 after a man claiming to be a field service engineer appeared unexpectedly at the Radiology Department's diagnostic area and told an on-duty attendant he had come to repair the scanner's 128K-byte processor.

Convinced of the man's authenticity, the attendant unlocked the scanning room door and let the phony service engineer in to make his "repairs." A few hours later, four Eclipse S/200 processor and memory boards were discovered missing.

Police have launched an investigation into the case but have yet to make any arrests. Until they do so, Briggs said local law enforcement officials have asked the medical center's personnel not divulge any details about how the heist worked.

The attendant who admitted the thief to the Radiology Department's scanning room had no reason to doubt the "repairman's" credentials, Briggs said, because the area is the scene of many surprise maintenance visits, even during the wee hours of the morning.

Exactly what the thief intends to do with the four stolen circuit boards remains unclear. He might have wanted them as parts for his own personal computer, or he might have planned to sell them on the electronics black market, where they would fetch a total of about $4,000 to $5,000, Briggs said.

Directly from their vendor, the boards cost a total of about $17,000, medical center sources estimated.

1st time offered!!
DEC® CTS-300®/CTS-500® SOFTWARE USERS
MECHANIZED PROGRAM/REPORT GENERATOR RIMS/MPG™
(Requestor Oriented Information Management System/ Mechanized Program Generator)
The ultimate programmer's aid...
Here are just a few reasons why you need RIMS/MPG:
• It is both a CTS-300/CTS-500 Report Generator.
• It will cut your in-house program development times tremendously (ISR has been reducing its own in-house programming costs by 60%-80%).
• It runs in DIBOL®, BASIC PLUS® and BASIC PLUS 2®.
• It writes programs which are fully compatible with your current MCBA® file structures.
• "It can be sold to your customers"
• It even produces systems specifications!
For more information, please call or write:
ISR
Information & Systems Research, Inc.
Jenkins Building, Suite 208
4600 William Penn Highway
Monroeville, PA 15146
(412) 373-[illegible]
RIMS/MPG — The Tireless Worker
® DEC DIBOL, CTS-300, and CTS-500 are trademarks of the Digital Equipment Corporation.
™ RIMS/MPG is a trademark of Information & Systems Research, Inc.
® MCBA is the registered trademark of Mini-Computer Business Applications, Inc.

Call for Papers

SIXTEENTH MEETING OF THE COMPUTER PERFORMANCE EVALUATION USERS GROUP (CPEUG), Orlando, Fla. Oct. 20-23.

Papers and relevant studies are invited on CPE trends with particular interest in installation management, workload forecasting, network performance, distributed systems, fraud and security, measurement of user satisfaction, workload modeling, benchmarking, statistical methods, performance prediction techniques, capacity planning and system design.

Submit 3 copies of the abstracts by March 15 to James Mulford, International Computing Co., 5717 Huberville Road, Dayton, Ohio 45431. Tutorial outlines and case study outlines should be sent, also by March 15, to Judith G. Abbleck, The Mitre Corp., 1820 Dolley Madison Blvd., McLean, Va. 22102. Final versions are due May 1.

TEXAS INSTRUMENTS
WITH BUBBLE MEMORY
World's Most Reliable Portable Bubble Memory Terminal!
In stock for immediate delivery
ALSO AVAILABLE FROM STOCK:
• T.I. Portables
• T.I. ASR & KSR
• ADDS CRTS
• Decwriters
• Diablo Printers
• Xerox Printers
• Floppy Disks
• Hazeltine CRTS
• Video Projectors
• TWX-500 Systems
• Video Adapters
• Modems & Couplers

Westwood Associates
DATA COMMUNICATIONS EQUIPMENT
25 Route 22 East / P.O. Box 10, Springfield, N.J. 07081
(201) 376-4242
N.Y.C. Area (212) [illegible] Connecticut Area [illegible]
Baltimore Area (301) [illegible] Philadelphia Area [illegible]
Cleveland Area (216) [illegible] Pittsburgh Area [illegible]
Washington Area (202) [illegible]

Software AG is making unbelievable claims about

AT A

We're making some pretty bold statements about NATURAL, our revolutionary new interactive database language – the very first of its kind in existence.

NATURAL cuts database program development time by up to 80%! NATURAL used in conjunction with ADABAS eliminates all the time-consuming batch/file mechanics of conventional languages. Yet NATURAL is a structured language that provides a comprehensive alternate to COBOL and PL/1, along with the unique added advantage of line-for-line syntax checking.

NATURAL creates file case mapping! With NATURAL you can develop any TP screen [illegible] that suits your special [illegible] best – completely [illegible] your terminal and TP [illegible] in [illegible] fraction of the time and [illegible] any standard pro-

[illegible] a pro-[illegible] the [illegible]

NATURAL can actually read your Data Dictionary! And with NATURAL you can readily store programs in your Data Dictionary for subsequent execution or modification either in source or object code.

NATURAL automatically facilitates the relational database environment! Now, you can form logical relationships from information in several different files, or information from the same file, but viewed in a variety of different ways. Quickly and easily with NATURAL.

Frankly, we hope you have trouble swallowing these very ambitious claims we're making about NATURAL. Because Software AG wants the chance to show you that everything we claim about NATURAL is absolutely true! We'd like to set up a one-on-one demonstration of NATURAL as soon as possible. Your terminal or ours. Call us directly at (703) 860-5050. Or fill in the coupon below and mail it to us today.

Once you see for yourself how simple NATURAL is to use, how quickly it lets you communicate with your database, how much it can save you in time, mechanics, and cost, we think you'll want to make NATURAL an important part of your DB/DC environment.

Because then, you'll be a believer – in NATURAL.

I'd like more information on NATURAL.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

Computer _____

SOFTWARE AG OF NORTH AMERICA, INC.

[illegible] Center
[illegible]

NBA Star Chosen by DP Ballot

LANDOVER, Md. — A computer was instrumental again this year in the selection of George "Ice Man" Gervin as the National Basketball Association (NBA) All Star game's Most Valuable Player.

With a computer to process the vote at the East-West game here at the Capital Centre, sportswriters could wait til nearly the end of the game before making their choices. Gervin, who played for the East, contributed to that team's 144-136 win over the West.

The computing facilities were provided by Honeywell, Inc., and included a Level 6 Model 33 with 128K bytes of memory, 10M bytes of disk storage, a VIP 7800 CRT terminal and a 300 card/min reader.

To register their votes, the sportswriters selected a ballot from either of two packets in front of them — one for the East and one for the West. Each ballot bore the preprinted name of a player on court.

George 'Ice Man' Gervin

It was necessary only to sign the appropriate card and hand it to a volunteer. The card reader read the votes and tabulated the results in seconds.

Assembly Language Programming To be Topic of IEEE Tutorial

WORCESTER, Mass. — The Institute of Electrical and Electronics Engineers, Inc. (IEEE) is offering a two-day tutorial course on Assembly language programming here at the Sheraton Lincoln Inn, March 7.

The course is intended to acquaint engineers, programmers and technicians with the basic Assembly language programming methods for common microprocessors, IEEE said.

The course will provide an introduction to microprocessor Assembly language for the Intel Corp. 8080/8085 processor. Course material is directed toward solving engineering problems, using a textbook by Dr. Lance Leventhal, IEEE said.

The course costs $165 for IEEE members and $205 for nonmembers, the organization said from 445 Hoes Lane, Piscataway, N.J. 08854.

5 Ways to boost your productivity. With SUPERWYLBUR.*

SUPERWYLBUR*—the powerful, multi-purpose interactive computer software package from Optimum Systems Incorporated—lets you boost your productivity in five key areas:

1. Macro Programming With SUPERWYLBUR, you can execute sequences of presorted commands to automate virtually any routine activity—and even interact with macro programs while they are being executed.

2. Programming SUPERWYLBUR greatly improves your programming productivity by allowing the programmer to interactively modify, submit compiles and tests, and scan the output—all on-line through the terminal.

3. Word Processing SUPERWYLBUR lets you format, justify, hyphenate, paginate, and create headings for all your documents and letters. SUPERWYLBUR allows easy creation of listings on high-speed printers—giving you up to 20 pages of hard copy per minute.

4. Text Editing SUPERWYLBUR lets you create, modify, store, and retrieve text quickly and accurately—and access up to ten 10,000-line files concurrently.

5. Remote Job Entry With SUPERWYLBUR, you can submit jobs to your computer's batch stream, route output to remote sites, check and alter job status, or selectively retrieve job output at your terminal. SUPERWYLBUR helps you avoid unnecessary printer listings and get the data you need on-line in less than a second.

SUPERWYLBUR runs under OS/MVT, VS1, SVS, and MVS on IBM-compatible systems. SUPERWYLBUR supports full-screen 3270 CRT's as well as IBM 2741 and ASCII terminals.

SUPERWYLBUR is ready to boost your processing and programming efficiency today—on your equipment or as a service through any of our branch offices.

Call or write for a free brochure.

Optimum Systems Incorporated Marketing Department
2801 Northwestern Parkway Santa Clara, CA 95051 (408) 987-4444

*SUPERWYLBUR is a mark of Optimum Systems Incorporated, denoting a computer software system proprietary to Optimum Systems Incorporated.

Bibliography of DP Books Lists 250 New 1979 Entries

By J. Daniel Couger
Special to CW

After seven years of relatively stable output, the number of new computer books increased 25% in 1979 when more than 250 books were published.

All are listed in the 13th edition of the *Annual Bibliography of Computer-Oriented Books*, released this month by the University of Colorado.

Accompanying the increase in quantity was an increase in the quality of books, particularly in the area of distributed systems and special programming languages. Conversely, of the 18 new books on DP management, only seven are noteworthy.

The quality of books in the advanced programming category is excellent, continuing the trend of the past three years. Nineteen new books were published in that area. While there was a surprising decline in the number of new books in the application areas (only 20), the increase in books on microcomputers and personal computing (14) will hardly be a surprise.

All introductory-type books published prior to 1975 were deleted. Despite the deletions, the bibliography still contains more than 1,000 books from over 150 publishers. The bibliography separates the books into 55 categories and catalogs them according to type (reference, textbook, handbook) and style of presentation (programmed instruction, case study or narrative).

Programming Books

Of the 107 new programming books, 58 fall into the advanced programming category. Harlan Mill's new book *Structured Programming* is a valuable contribution to the field, as is *The Art of Software Testing* by Glen Myers.

The 23 new system design books reflected a continuation of last year's trend, with the section on distributed systems expanding more than 50%. *Distributed System Design* by Mariani and Palmer is an example of the high quality books available on that topic.

The section on structured design now contains 11 books. Additions to the systems area included five data base books and four MIS/DSS books. In the latter category, the comprehensive scope of *Information Resources Management* by Forest Horton makes it an important addition to the field.

DP Management

Eighteen new books on DP management debuted. In this 62-book category, one new subsection is on managing software projects: New books in that subsection are *Software Management* (Reifer) and *Software Life Cycle Management* (Basili).

There are now 10 books in the project management section and five in the personnel performance section. A new book in the latter category is Greenbaum's *In The Name of Efficiency*. A newcomer in the system security section is *Computer Crime Investigation Manual* by Schabeck.

The section on microcomputer books contains 14 listings, including new books on design and on applications. An example in the latter category is *Computer Power for the Small Business* by Sippl and Dahl. This section also includes six books on personal computing, such as *How to Make Money With Your Microcomputer* by Townsend and Miller.

The bibliography contains 12 categories on computer applications. Only 20 books were added to this section. Nevertheless, the quality of the books remains satisfactory, with the addition of books like Tom Naylor's *Simulation Models in Corporate Planning*.

Programming Languages

Books on programming languages continue to proliferate. The trend to convert traditional books to a structured approach improved the quality of this section. Examples are *Problem Solving and Structured Programming in Basic* (Koffman and Friedman) and *Structured Fortran Programming* (Dock).

The new section on Pascal now contains seven books. Basic took over the lead from Fortan in the number of new books, with 20. Variations of PL/I (such as PL/Zero, PL/C, PL/M and PL/Z) caused this language to come in third, with seven additions to the field.

A new language added to this section was "C." Two books were published in 1979, including the *C Programming Language* by Kernighan and Ritchie. Four books on the Mumps language were added to the bibliography. Only one book was published on RPG.

Copies of the bibliography are available for $4 from Computing Newsletter, Box 7345, Colorado Springs, Colo. 80933. The cost is $6 if an invoice is required.

Couger is a professor of computer and management science at the University of Colorado.

Boeing Division Training Center Opens in Seattle

MORRISTOWN, N.J. — Boeing Computer Services Co.'s (BCS) Education and Training Division recently opened a National Training Center in Seattle.

The center, BCS' largest to date, will provide training to corporate and governmental workers. Regularly scheduled classes are slated to be offered on a variety of DP subjects as well as some related, non-DP subjects, a spokesman said.

The Seattle building will house a Hewlett-Packard Co. 3000 Series III minicomputer as well as provide access, via time-sharing, to IBM and Control Data Corp. systems, a spokesman said. A minicomputer lab is equipped with terminals for hardware and software classes. The facility also features classrooms, a theater and a library, BCS said.

The National Training Center offers 70 to 80 courses on such subjects as Cobol, Fortran and computer graphics. Other BCS training facilities are in New York City, San Francisco, Detroit, Chicago and Washington, D.C.

Courses vary from one-day seminars to three-week courses. Prices also vary depending on the type and length of course.

The program is open only to corporations and government agencies, BCS said.

Managers on the Move

THOMAS H. SIMPSON has been named technical director of Amdahl Corp. in Sunnyvale, Calif.

Simpson is joining Amdahl after 15 years with IBM, where he earned the distinction of IBM Fellow. During his years with IBM, he was involved with the design of operating system software and was instrumental in the development of Hasp and JES2 subsystems for IBM operating systems.

He previously played a major role in developing operating system software for the Apollo lunar landing project.

Simpson is a graduate of the University of Texas, where he received a bachelor's degree in mathematics.

•••

FREDERICK MEYERRIECKS has been promoted to assistant vice-president of DP at Eastern States Bankcard Association, Inc. in Lake Success, N.Y.

Meyerriecks joined Eastern States in 1976 as a senior on-line programmer/-analyst. Prior to his promotion, he was the director of data center operations.

He holds a B.A. in English from Queens College.

•••

GARRY R. BEATY has been named director of corporate information service at Petrolane, Inc. in Long Beach, Calif.

Beaty came to Petrolane in January 1979 as assistant director, corporate information service. Previously, he was operations manager of management information systems at Western Gear Corp. and held various DP posts at Paccar, Inc.

He will be responsible for all the department's activities.

•••

LESLIE J. LAMMERS has been appointed an assistant vice-president of Morgan Guaranty Trust Co. in New York. She is in the Management Information and Profit Analysis Department.

Lammers joined Morgan in 1979 as an assistant treasurer.

She is a graduate of the University of Texas with a B.B.A. degree.

•••

GEORGE C. TATTER has been named director of information systems at Applied Data Research, Inc. in Princeton, N.J.

Tatter was formerly employed with Peat, Marwick, Mitchell & Co. as a consultant in DP systems and accounting. He has most recently been manager of management consulting in the company's Newark, N.J., office.

Tatter is a graduate of Rider College.

•••

LARRY D. SLAIGHT has been promoted to vice-president of DP at Farmland Industries, Inc. in Kansas City, Mo.

Slaight was employed by Far-Mar-Co., Inc., Farmland's grain marketing subsidiary, in 1971 as a systems representative. Most recently, he was executive director of DP marketing in Hutchinson, Kan.

Slaight attended the University of Georgia and Brown-Mackie College.

•••

ROBERT A. CRAVEN has been appointed vice-president of operations and systems for Optimum Systems, Inc. (OSI).

Craven will be responsible for the planning and evaluation of corporate hardware, software and technical development activities.

Corporate DP Topic of Course

LOS ANGELES — A series of five-day seminars this spring, sponsored by the Technology Transfer Institute (TTI) here, will describe distributed processing, data base networks and office-of-the-future technologies.

Designed to give an integrated view of those technologies and the details necessary to design flexible, cost-effective systems for the future, the seminars will be held in Atlanta, Feb. 25-29; San Francisco, March 3-7; New York, March 17-21; and Chicago, March 24-28.

The course, led by James Martin, will also provide an overall management philosophy for corporate DP, with special emphasis on the office of the future. The registration fee for the five days is $1,150, which includes all documentation, lunches and breaks.

Further information is available from TTI, P.O. Box 49765, Los Angeles, Calif. 90049.

Telecommunications Topic of Seminar

LOS ANGELES — Technology Transfer Institute (TTI) here is offering a one-day seminar aimed at explaining telecommunications issues to managers.

Headed by TTI's James Jewett and Jacqueline Shrago, co-founders of Telco Research Corp., the seminar will identify management perspectives and evaluate the economic trade-offs of mixed voice data networks, ACDs, PABXs, integrated systmes and related applications.

The seminar is scheduled March 19 in San Francisco, April 10 in Chicago and April 25 in New York. It costs $225 including all documentations and lunch.

TTI can be reached at P.O. Box 49765, Los Angeles, Calif. 90049.

DOES YOUR DBMS MEASURE UP?

YES NO

- ☐ ☐ Full text storage.
- ☐ ☐ On-line document retrieval with Boolean logic.
- ☐ ☐ Retrievals using any word, phrase, or number.
- ☐ ☐ Synonym, root-word and character string searching.
- ☐ ☐ Search speed independent of database size.

If it doesn't, we've got the answer.

It's DOCU/MASTER™ — a new information storage and retrieval system. It's the perfect complement to your existing DBMS.

DOCU/MASTER handles the data your DBMS can't. Reports, memos, regulations, contracts — you name it. It's quick, efficient, and very easy to use.

Now here's the best part. There's no programming. You can begin searching your DOCU/MASTER database the day you install it.

We'd like to take your measurements for a DOCU/MASTER. Call or write today for more information.

For more information mail this coupon today to:

turnkey systems inc.
Customer Service Center
P.O. Box 416
Pelham Manor, NY 10801

Or call your nearest TSI office:

Norwalk, CT
Atlanta, GA
Lombard, IL
Southfield, MI
Los Gatos, CA
Dallas, TX
Markham, ON

TSI turnkey systems inc.
A Division of National CSS

WA00216

☐ Send a DOCU/MASTER brochure.
☐ Have a TSI representative call me.
☐ We'd like a demo.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone _____ CPU _____

Politics Seen Block to Global Data Links in '80s

By a CW Staff Writer

WASHINGTON, D.C. — In the decade ahead, technological progress by itself could spread linked data bases further apart, reduce the dollar costs of broadband traffic and ease the interconnection of different types of systems.

But, according to MIT Prof. Ithiel de Sola Pool, the plight of data communications users will be determined by political as well as technological factors. In fact, nationalism may badly constrain efforts to establish global links for reliable, high-speed transmission of information, the director of MIT's Center for Communications Policy observed at a recent conference here.

Pool drew a distinction between what technology promises and what politics may allow the 1980s user. "If politics and human factors did not enter the picture," he told a conference session, "that would lead me to forecast a series of global competitive networks ... serving a variety of purposes [while] interconnected but not confined by national boundaries".

Political Restraints

"If technology were the only consideration," Pool continued, "one might expect a situation to develop in which users in any country could become the customers of any service that [attracted] them via one or another ... long lines connection."

Notwithstanding progress in what machines can do, the key issue before the 1980s user is what machines may do within the context of political processes, Pool suggested. National governments, not research and development laboratories, will restrict the networks carrying data across borders.

Governments around the world will probably interconnect state-owned utility monopolies such as the postal, telephone and telegraph authorities in Europe, Pool said. But that is "not the same thing as a global market of a variety of networks."

Transborder data flow restrictions would generally hurt countries of "less than continental size," the MIT professor stated. Nations other than the U.S., Soviet Union, Canada, Brazil, India and China "are clearly suboptimal in size from the perspective of satellite ... and specialized network technology."

By enforcing rigid standards for data network devices, protocols and methods, the smaller countries would diminish significantly the range of communications services accessible to their users.

Then why set such restrictions? No government relishes dependence on foreign carriers for a function as vital as telecommunications, Pool noted.

Two aspects of transborder data flow that any government would like to control as completely as possible are privacy — since interception of sensitive data traffic may compromise severely the security of government or commercial interests — and reliability — since an unexpected cutoff of information can be just as devastating as a cutoff of petroleum products.

Another political phenomenon Pool expects to affect this decade's data communications is public policy on competition in each country's communications marketplace. In the U.S., government is "clearly" inclined to stimulate competition through such regulative bodies as the Federal Communications Commission, Pool said.

In other countries, however, state-owned monopolies are gaining control of the equipment and services available to users, he said.

Vendor Interrelationships

A third political constraint on communications is how the major vendors and carriers will mobilize with respect to one another. The largest communications sellers, such as monopolies from various countries, may discover they cannot address very specialized user needs, Pool pointed out.

Alluding to firms like AT&T, Pool said "there is no natural technical limit on what companies that started out as telecommunications carriers can do ... but large bureaucratic organizations have some real disadvantages because of their size."

Bell and similar organizations shy away from offering customized service because they do not wish to set precedents for departing from standard practices, which are much easier to administer on a large scale. Such firms cannot afford to handle many customers that demand tailor-made functions.

Hence, "there will always be innovative services that lean, young, aggressive companies can carve out of the whole and do at a profit," the professor said.

"How big these [companies] become and how firmly established depends more on entrepreneurship ... and government policy than it does on technology," he concluded.

Perkin-Elmer INTERDATA users:

Two Boards in One!

Universal Clock with Power Fail/ Auto Restart at half the cost!

MACROLINK'S Universal Clock Module includes Power Fail Detect Hardware on the same half-board — so you get two functions in the same space...and for less than half price of two separate boards.

- for use with all current Perkin-Elmer/Interdata computers
- software compatible with both OS/16 and OS/32 and host-supplied diagnostics; directly replaces Perkin-Elmer's M48-000.
- both precision interval and line frequency clocks
- low power requirements — .4 amp total
- only $550 complete (U.S.A.); OEM discounts available.

Perkin-Elmer and Interdata are registered trademarks of Perkin-Elmer Corporation

Distributor Inquiries Invited

macrolink

Iowa-Based Projects to Study Instructional Uses of Micros

IOWA CITY, Iowa — Conduit, a University of Iowa-based nonprofit organization that reviews, tests and distributes computer-based instructional programs, is investigating possible ways to expand microcomputer use in education.

Through two projects — the first funded by the National Science Foundation (NSF) and the second supported by the Fund for the Improvement of Postsecondary Education — Conduit intends to determine the feasibility of increased microcomputer use in schools.

The NSF project is broken into two phases, the first an 18-month experimental period, followed by a second phase in which materials are disseminated.

The experimental period was designed to review the suitability of converting to microcomputer systems some current projects now running on time-sharing. The advantages offered by microcomputers — such as audio, color, graphics displays and various input devices — will be examined, as will ease of implementation.

In addition, the project will seek to determine whether time-sharing is in fact a better choice than microcomputers in some cases. Conduit will also examine the feasibility of developing programs from scratch rather than converting them from another system, according to Hal Peters, Conduit's associate director.

The reliability capabilities and instructional effectiveness of existing computer-based learning — as opposed to microcomputer-based learning — is another area that the project will cover.

Once all information is gathered, Conduit plans to prepare a set of guidelines for microcomputer instructional materials in general, as well as for those relating to specific popular systems.

The second phase of the project will be to distribute those materials and programs that are judged to be worth converting from time-sharing to microcomputer-based systems. Distribution will be accomplished through Conduit's normal mail-order channels, as well as through computer retail stores and microcomputer vendors.

Four disciplines will be examined in this experiment: mathematics, physics, chemistry and biology. Topics in advanced undergraduate instruction will be emphasized.

The other project undertaken by the organization focuses on the need for dissemination of instructional materials to schools. Contending that computers in education have fallen short of their potential, Condoit plans to identify and distribute 35 microcomputer-based instructional modules in a variety of disciplines, including the humanities and social sciences, according to Peters.

One result of the project will be to provide examples, guidelines and standards for future development of materials.

To facilitate the projects, Condoit needs microcomputer-based materials designed and developed by instructors (or other authors) for reviewing and testing. Conduit pays royalty fees to the authors and, after testing, distributes material to other educational institutions — primarily colleges and universities.

Conduit began in the early 70s as an NSF-sponsored project to study problems of sharing computer-based instructional materials among different institutions. It can be reached at P.O. Box 388, Iowa City, Iowa 52244.

'Say, Isn't That a Pepperoni Pizza?

PRIZED

Some thing
For instanc
billing and shipping
this information cou pl
Graham cre ed
company's vital inte nati
50% more durable t
It'll not onl help
help your company surv
that's what makes it a va

ome
Loss any of
tect your
tape that's
ity.
ould even
tape. But

GRAHAM MAGNETICS

Calendar

March 10-12, Dallas — **DP Project Management: A Practical Approach.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 24-26 in Washington, D.C.

March 10-12, Atlanta — **Data Base Management System for Minis.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 12-14 in Chicago.

March 10-12, Dallas — **Network-Tech Control Design and Operations.** Contact: Data Communications, McGraw-Hill Conference & Exposition Center, Room 3677, 1221 Ave., of the Americas, New York, N.Y. 10020.

March 10-12, Washington, D.C. — **Effective Data Systems Development.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

March 10-12, Toronto — **National Office Exhibition and Office of Tomorrow Conference.** Contact: Whitsed Publishing Ltd., Suite 2504, 2 Bloor St. W., Toronto, Ont. Canada. M4W 3E2, Canada.

March 10-12, Chicago — **Data Processing Operations Mangement.** Contact: MC Seminar Division, 1307 E. 60 St., University of Chicago, Chicago, Ill. 60637.

March 11, Washington, D.C. — **Office Automation Briefing and Workshop.** Contact: Micronet, Inc., Watergate Mall, 2551 Virginia Ave. N.W., Washington, D.C. 20037. Also being held March 27 in Washington, D.C.

March 11, Wilmington, Del. — **Microdelcon 80,** sponsored by the Institute of Electrical and Electronics Engineers. Contact: Chuck Berg, E.I. Dupont de Nemours & Co., Wilmington, Del. 19898.

March 11-12, Washington, D.C. — **Small Computer Symposium.** Contact: American Institute of Industrial Engineers, Inc., 8610 Teresa Ann Court, Alexandria, Va. 22308.

March 11-13, Zurich, Switzerland — **Semicon/Europa.** Contact: Semiconductor Equipment and Materials Institute, Suite 212, 625 Ellis St., Mountain View, Calif. 94043.

March 11-14, Pacific Grove, Calif. — **Fifth Workshop on Computer Architecture for Nonnumeric Processing,** sponsored by the Institute of Electrical and Electronics Engineers. Contact: W.F. King, IBM, K51/282, 5600 Cottle Road, San Jose, Calif. 95193.

March 12-13, Washington, D.C. — **Office Automation Planning Workshop for Managers.** Contact: Micronet, Inc., Watergate Mall, 2551 Virginia Ave., N.W., Washington, D.C. 20037. Also being held March 25-26 in Washington, D.C.

March 12-14, Kansas City, Kan. — **Check Processing Conference.** Contact: Bank Administration Institute, P.O. Box 500, 303 S. Northwest Highway, Park Ridge, Ill. 60068.

March 12-14, Phoenix — **Information Systems Conference for Users.** Contact: Wordpro International, Suite 109, 2035 N. Central Ave., Phoenix, Ariz. 85004. Also being held March 26-28 in Denver.

March 12-14, Phoenix — **Technical Symposium '80,** sponsored by the Institute of Electrical and Electronics Engineers. Contact: H. James Martin, P.O. Box 21666, Station 1278, Phoenix, Ariz. 85036.

March 12-14, Chicago — **Effective Computer Operations Management.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 31- April 2 in Los Angeles and San Francisco.

March 16-20, Denver — **Honeywell Users Group Conference.** Contact: Honeywell, Inc., 200 Smith St., Waltham, Mass. 02154.

March 17-18, San Francisco — **How to Manage Data and Information as a Resource.** Contact: Barnett Data Systems, 19 Orchard Way No., Rockville, Md. 20854.

March 17-18, Orlando, Fla. — **Computer Negotiations Workshop.** Contact: International Computer Negotiations, Inc., 1331 Palmetto Ave., Winter Park, Fla. 32789.

March 17-19, Boston — **Data Communication Services and Protocols.** Contact: Technology Transfer Institute, P.O. Box 49765, Los Angeles, Calif. 90049.

March 17-19, Washington, D.C. — **Electronic Mail: An Overview of Concepts, Systems and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 17-19, Dallas — **Computer Performance Measurement: Tools and Techniques for Increased System Productivity.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran N.J. 08075. Also being held March 24-26 in Los Angeles.

March 17-20, Miami — **Interface '80,** cosponsored by *Datamation* magazine. Contact: Interface Group, 160 Speen St., Framingham, Mass. 01701.

March 17-21, Atlanta — **Management Style: Self-Directed Growth.** Contact: American Mangement Associations, 135 W. 50 St., New York, N.Y. 10020.

March 17-21, Vienna, Austria — **International Congress on Data Processing in Europe.** Contact: Interconvention, P.O. Box 35, A-1095 Wien, Austria.

March 19, San Francisco — **Telecommunications Management.** Contact: Technology Transfer Institute, P.O. Box 49765, Los Angeles, Calif. 90049.

March 19-20, Frankfurt, Germany — **IBM VM/CMS: Conference.** Contact: On-Line Conferences Ltd., Cleveland Road, Uxbridge, England UB8 2DD.

March 19-21, Tampa, Fla. — **13th Annual Simulation Symposium,** cosponsored by the Institute of Electrical and Electronics Engineers and Association for Computing Machinery. Contact: Sudesh Kumar, 1511 Tucker Lane, Encinitas, Calif. 92024.

March 19-21, Chicago — **Computers in Manufacturing.** Contact: American Institute of Industrial Engineers, P.O. Box 3727, Santa Monica, Calif. 90403.

March 19-21, San Francisco — **How to Build and Use a Data and Information Resource Directory.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

March 19-21, New York — **Computer Networks.** Contact: Technology Transfer Institute, P.O. Box 49765, Los Angeles, Calif. 90049.

March 19-21, Arlington, Va. — **National Association of Bank Services (Nabs) Semiannual Meeting.** Contact: Nabs, Suite 1331, 50 W. Broad St., Columbus, Ohio 43215.

March 20, Norfolk, Va — **Sixth Federal ADP (FADP) Expo.** Contact: FADP Expo '80, HQ TRADOC, DPFO, Ft. Monroe, Va. 23651.

March 20-21 Miami — **Interactive Computing and the DTSS Associates Plan.** Contact: DTSS, Inc., 10 Allen St., Hanover, N.H. 03755.

March 20-21, Atlanta — **Planning APLSV for the '80s.** Contact: Interprocess Systems, Inc., Suite 112, 1260 Winchester Parkway, Smyrna, Ga. 30080.

March 24-25, San Francisco — **The Successful Application of a Geographically Based Information System.** Contact: Comaric Design Systems, 315 Bay St., San Francisco, Calif. 94133.

March 24-26, Washington, D.C. — **Distributed Data Processing, Data Communications and Networks, Minicomputers.** Contact: American Institute of Industrial Engineers, P.O. Box 3727, Santa Monica, Calif. 90403.

March 24-26, Cherry Hill, N.J. — **Data Entry Mangement and Supervision Seminar.** Contact: Management Information Corp., 140 Barclay Center, Cherry Hill, N.J. 08034.

March 24-26, Los Angeles — **Satellite Networks.** Contact: Technology Transfer Institute, P.O. Box 49765, Los Angeles, Calif. 90049.

March 24-28, Houston — **Data Base Modeling and Design Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

March 25, Dallas — **Invitational Computer Conferences.** Contact: B.J. Johnson & Associates, Suite 203, 2503 Eastbluff Drive, Newport Beach, Calif. 92660. Also being held March 27 in Houston.

March 25-26, New York — **The New IBM Network Strategy.** Contact: Yankee Group, P.O. Box 43, Harvard Sq., Cambridge, Mass. 02114.

March 25-27, Oklahoma City, Okla. — **Southwest Computer Conference.** Contact: University of Tulsa, 600 S. College, Tulsa, Okla. 74104.

March 25-27, Brighton, England — **Electro-Optics/Laser International.** Contact: British Information Services, 845 Third Ave., New York, N.Y. 10022.

March 27-28, St Louis, Mo. — **Datacon '80,** sponsored by Data Processing Management Association and Association for Systems Management. Contact: Richard A. Bauer, P.O. Box 14490, St. Louis, Mo. 63178.

Order the professional's choice.

UCSD Pascal.™

The Pascal everyone is talking about is UCSD Pascal...with over 10,000 users and growing. The fully developed Pascal is available with support from a professional software company. Implemented on most major microprocessors.

Not just another compiler, but complete development software — from operating system to screen-oriented editor. Language extensions for systems development and commercial applications programming.

Program portability that allows programs written on one microcomputer to run without recompilation on different microcomputers. This protects your software investment...without restricting your hardware options.

If you have CP/M,* visit your local computer store or order below. System supplied on single-density, soft-sectored, 8" floppy disks and requires 48K of contiguous RAM. For other systems call us or write for more information. Telephone orders accepted with Master Charge or VISA.

SOFTECH MICROSYSTEMS A SUBSIDIARY OF SOFTECH

9494 Black Mountain Road • San Diego • CA • 92126
TEL: (714) 578-6105 • TWX: 910-335-1594

CP/M is a registered trademark of Digital Research Corporation. LSI-11 is a trademark of Digital Equipment Corporation. UCSD Pascal is a trademark of the Regents of the University of California.

☐ Yes! Rush me a complete UCSD Pascal system for my CP/M* based microcomputer. A check or money order for $300.00 is enclosed. I have a _____ computer.

☐ Send me more information about UCSD Pascal. Versions are available for systems using the following microprocessors: LSI-11,™ 6502, 6800, 6809, 9900, Z80 and 8080/8085.

☐ Send me only the complete set of documentation for UCSD Pascal. A check or money order for $37.00 is enclosed.

☐ Send distributor information.

Name _____
Company _____
Address _____
City _____
State/Zip _____
M/C or VISA # _____ Exp. Date _____

UCSD PASCAL

Mass. and Calif. residents enclose applicable sales tax. CW 2/22

COMPUTERWORLD

. . . the one weekly newspaper that's designed to fulfill your unique "need to know"... : the one newspaper that can give you all the current information you need to benefit you, your organization and your career progress . . . 52 weeks of incisive news, commentary and special reports . . . subscribe today, use the attached postage paid order form.

☐ Please enter my subscription
(details on back)

☐ I'm already a subscriber, but I'd like you to change my:
- ☐ address
- ☐ title
- ☐ industry
- ☐ other

My current mailing label is attached and I've filled in new information on the other side

Put old label or label information here

Please send me COMPUTERWORLD for one year RATES: United States—$30 Canada, Central & South America—$50 Europe and Near East—$90 Other Foreign—$150 (Airmail Service)

☐ Check Enclosed
☐ Am Ex ☐ BA/Visa ☐ MC

(MC Only List four digits above your name)

If charge we must have cardholder's signature _____ Expiration Date _____

First Initial	Middle Initial	Surname	
Your Title			
Company Name			
Mail To			
City	State	Zip Code	

Address shown is:
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld*

☐ Check here if you're interested in receiving information on *Computerworld's* Index

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

CIRCULATION DEPT. 375 Cochituate Road, Rte. 30, Framingham, MA 01701

Detach here, fold, and place in post-paid envelope attached through binding.

PLEASE CIRCLE 1 NUMBER IN EACH CATEGORY

BUSINESS INDUSTRY
10 Manufacturer of Computer or DP Hardware/Peripherals
05 Manufacturer (other)
05 DP Service Bureau/Software/Planning/Consulting
40 Public Utility/Communication Systems/Transportation
05 Wholesale/Retail Trade
05 Finance/Insurance/Real Estate
70 Mining/Construction/Petroleum/Refining
75 Business Service (except DP)
05 Education/Medicine/Law
05 Government - Federal/State/Local
05 Printing/Publishing/Other Communication Service
05 Other _____

TITLE OCCUPATION/FUNCTION
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/Administrative Services
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mfg Sales Representative
52 Other Sales/Marketing
60 Consultant
70 Lawyer/Accountant
05 Librarian/Educator/Student
05 Other _____

Turnaround Time
By Larry E[illegible]

Q After eight months my partner, Pat, and I have just completed a report which may have a significant bearing on the direction of our company's data processing. Yesterday the inevitable happened — we were asked to give a one-and-a-half-hour presentation to the executive committee. We have about four weeks to prepare.

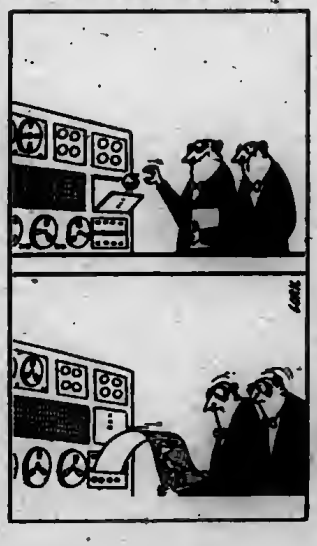
Pat has done a super job on the report, but it is widely known that Pat has had limited success in formal presentations. When not reading the transparency, Pat stares at the floor. A monotonic slow-talker, Pat will start heads nodding in four or five minutes.

I have mixed emotions about the presentation. I'm better than most in formal presentations, but would feel awkward doing the entire presentation.

A In the DP business, presentations are a part of life and Pat should learn to cope with this facet of his job. Skills in verbal communication can be learned and developed. Pat may never be a Grace Hopper or a James Martin, but with proper preparation and practice he could give an adequate-to-good presentation.

To make the most of your combined talents, I suggest that you start and end the presentation with Pat making two short (10- to 15-minute) presentations in between. To help prepare, get a good book on DP verbal communication and pick out important points to incorporate in your presentation. Ask a friend who is a skilled speaker for advice. Prepare an outline and begin the practice/feedback cycle. This time will be well spent, especially for Pat.

Even after the necessary skills have been developed, to be effective the presenter must gain confidence in his abilities. This experience should help that Pat build his confidence, and maybe next time you can split the presentation. I wish you success.



What to Do About a Poor Speaker?

Q Documentation is a serious problem at our installation. At present we don't have a methodology or system for documentation. Several vendors of such packages have made presentations and we are considering the purchase of one of them. How long would you anticipate it would take to implement a commercial methodology.

A Hard to say; however, it is a good question. I will accumulate and print the results if *Computerworld* readers who are users of Pride, SDM/70, Spectrum, etc. will send me a card stating elapsed time to implementation, man-months devoted to implementation and the number of professional DP personnel at the site.

Q I will graduate this year as an electrical engineer. After spending last summer working in a DP center, however, I have decided to pursue a career as a programmer/analyst. In fact, the company where I worked has invited me to interview for a permanent position.

Several things troubled me about this particular company, however. Last summer I did exactly the same work as people who were hired as long as two years ago. The analysts and programmers have been with the company either a short period of time, say one or two years, or ten or more years, with very few in between.

I also noticed the company has absolutely no training program. All training is essentially on-the-job.

Am I being overly concerned?

A Having no intermediate-term employees is a definite indication that the young people are leaving early. As is often the case, the older employees and their families have established roots and have rationalized that it is probably better to stay than to pick up and leave. This scenario is more common than one might think.

However, since you enjoyed your work last summer, I would take the interview and with it the opportunity to have a frank talk with your colleagues of a summer ago.

Sometimes an interview is limited to management and recruiting personnel, thereby giving the interviewee an artificial picture of the real working environment. Be sure to indicate to the people scheduling your interview that you wish to talk to some of your old colleagues.

Ask them about turnover, career path development and staff morale. Address the same questions to recruiting and management personnel, then compare notes. There should be a one-to-one correlation between the way management says it is and the way it is.

Q Of all of the pressing problems and issues in DP, both present and future, which one do you feel to be the most critical?

A I would like to turn this question around and ask CW readers what they feel to be the most critical DP issues and problems.

Drop me a note with your job title only and list which three of the following issues and problems you feel are the most pressing: DP auditing, privacy, certification, personnel retention, standards and procedures, continuing education, security, DP management, user interaction, rapid increase in technology, internal image, documentation and the ever-popular "other."

I'll compile and print the results.

Q My job is to provide user training for an on-line accounting system that has more than 250 terminals at numerous sites throughout the plant. Most of the training sessions are composed primarily of clerical personnel; some training sessions include firstline management.

I am constantly getting barraged by complaints about how the system "doesn't do this," it "shouldn't do that" or "here is a better way." People are really fed up and since I'm available, they vent their frustrations on me.

Their complaints are not without merit — the system really does stink and there are no changes or enhancements planned for the foreseeable future. However, the fact remains that I still have a job to do and can't speak for 30 seconds without a hostile interruption. How would you handle the situation?

A Contact your supervisor to determine if a formal vehicle exists to document these complaints and ideas. Don't step too far out of your job function, but no one would be harmed if you and your supervisor made an informal inquiry as to the last system evaluation (my guess is it was the postimplementation evaluation, if any).

If the system has been operational for more than one year without an evaluation, encourage the appropriate DP personnel to initiate such a review. Hopefully, you will be able to tell your users of an upcoming system evaluation with the prospect of some positive enhancements based on their recommendations. Let me know what happens.

Long is a professor at Lehigh University, a DP consultant and author.

'Turnaround Time' is a new reader service column that will appear regularly in *Computerworld*. All kinds of questions are invited, but readers are urged to keep them as concise as possible. Send them to Larry Long, Editorial Department, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

New Releases Available

MCBA® is proud to announce the *completion* of new releases of its Business Application Packages in:

• Data General CS COBOL

The packages listed below are now available in CS (Commercial System) COBOL for use on DG's CS/30, CS/40 and CS/60s.

• Data General Multi-User Extended BASIC

These same packages are now available for use on selected Data General microNOVA®s, NOVA®s, and Eclipses®

• Accounts Receivable (with Sales Analysis)
• Order Entry/Invoicing (with Inventory Control)
• Accounts Payable
• Payroll • General Ledger

Both versions of these packages are fully interactive and interfaced systems, allowing use in single or multi-terminal hard-disk environments.

MCBA offers flexible licensing of these packages including source code, complete documentation and one year's support. To obtain more information, contact the Sales Department at:

MCBA Mini-Computer Business Applications, Inc.
117 South Brand Boulevard
Glendale, California 91204
Telephone: (213) 247-9050 Telex: 194188

MicroNOVA® is a trademark, and NOVA® and Eclipse® are the registered trademarks of Data General Corp
MCBA® is a trademark of Mini-Computer Business Applications, Inc

EDITORIAL

Voter Manipulation?

The pervasive use of computerized mailing lists, demographic data and word processing technology in political campaigns raises some timely questions regarding the potential for manipulating voters.

Although the use of such technology in the 1980 presidential campaign does not quite approach the kind of Big Brother control that social observers have long feared, the selective presentation of information can and does affect the voting habits of the populace.

A good example of the effectiveness of such pinpointing techniques can be seen in the relative successes of the campaign strategies of Republican candidates John Connally and George Bush.

George Bush launched a relatively small but expert direct mail campaign aimed at drumming up political support from those most likely to respond favorably, based on economic, educational and geographic characteristics [CW, Jan. 28].

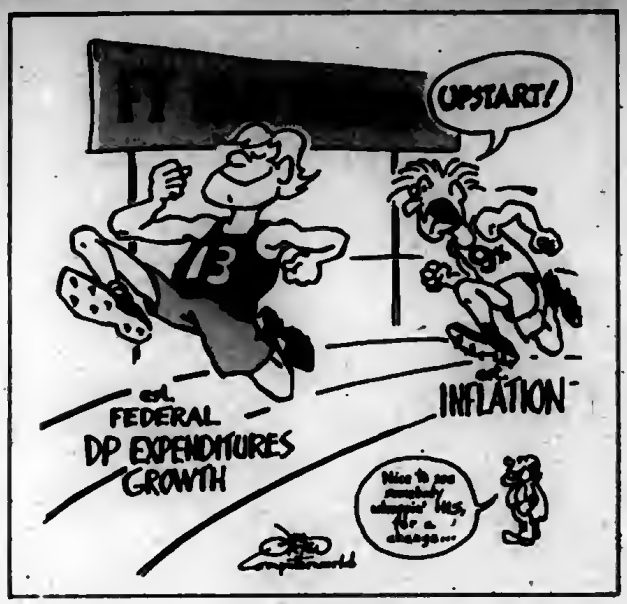
Connally, on the other hand, who remains far ahead of the other candidates in the amount of money raised, has spent much of it on nonselective advertising methods such as television and radio spots, which reach a wide audience but actually "hit" only a small percentage of listeners [CW, Feb. 4].

The surprising results of the Iowa caucus last month highlight the potential benefits of such targeting methods: Bush led the Republican pack with 32.8% of the vote while Connally lagged with a mere 9.7%.

Bush's success cannot be attributed entirely to his direct mail efforts, of course, but neither can such an effort be discounted in analyzing the reasons for his success.

And while candidates have tried to sway voters with selective campaigning for over 100 years — through interest group membership lists and "working the Irish wards" — never before has the technique reached so many people with such an accurate assessment of their predispositions.

In a society accustomed to electronic information-gathering, the question remains whether "persuadable" voters are getting "the truth, the whole truth and nothing but the truth."



DATA PAST

Five Years Ago
Feb. 12, 1975

ARMONK, N.Y. — IBM prepared to act on its leasing deals. The firm offered long-term leasing customers only limited one-year rate protection on its line of 370 virtual machines. IBM said it reserved the right to raise rental prices under such four-year contracts by 5% after the first year, another 5% after the second year and a further 5% the final year of the contract. IBM also promised "swift action" in collecting the penalty payments on long-term lease cancellations.

NEW YORK — The trial of the U.S. government's massive anti-trust suit against IBM was delayed by three to four weeks because of clerical problems in copying the extensive number of documents in the case. The problem, according to IBM lead attorney, Thomas Barr, was that the copying service used by the government "destroyed" the document sets so it was almost impossible to tell the order of pages.

Eight Years Ago
Feb. 9, 1972

NEWTON, Mass. — A *Computerworld* survey of DP budgets of firms listed among the top 100 computer users in the country concluded that major computer users would continue or expand their cost-cutting measures learned during tight budgetary times even when purse strings began to loosen. Of those surveyed, 75% reported that their budgets would either remain the same or increase, in sharp contrast to the past two years when surveys showed decreasing DP expenditures. Despite budget increases, users were continuing measures to get "more bang for the buck."

ATLANTA — Univac reassured RCA users that it would fill outstanding orders for RCA equipment and all new orders received by June 30, 1972. And existing RCA sites would not be forgotten: maintenance would be handled by customer engineers who moved over to Univac from RCA or by Univac personnel.

LETTERS

'Untruthful Allegations'

"Stolen Keyboards Recovered" [CW, Feb. 4] presented a number of untruthful, unfair and unsupported allegations that reflect falsely upon Metroplex Computer Co., its president and its secretary-treasurer. I want *Computerworld* and its readers to be aware of facts that contradict the information in the story:

1. We have already undertaken civil litigation to solve any allegations or problems relating to the title of merchandise bought and sold by Metroplex Computer Co.

2. The company and the two officers mentioned in the story are innocent of the allegations and intend to establish their innocence in court.

3. Metroplex Computer Co. has a four-year record of stable growth and profitability and we will not allow its good record to be damaged by false and misleading accusations.

4. We will be exonerated from all claims and allegations and will continue to do business fairly, reputably and successfully.

Donald O. Norris
President
Metroplex Computer Co., Inc.
Dallas, Texas

IBM Reply

On Jan. 22, IBM demonstrated the System/38 to emphasize the product's capabilities and IBM's readiness to meet its new delivery dates.

From that, *Computerworld* inferred future conversion problems [CW, Jan. 28]. Then a CW editorial drew the conclusion that IBM was not sufficiently concerned about its customers [CW, Feb. 4].

Let me correct the erroneous impression those reports may have left with CW readers.

Brian Utley of IBM was misquoted in the initial article. He did *not* say that the file changes may be difficult because of a lack of RPG-II documentation. In fact, files do not have to be changed, only copied.

He did *not* say users converting from a batch-oriented System/3 to an interactive System/38 are likely candidates for problems. In fact, batch programs cannot be "converted" to interactive.

As for the editorial, you should know that IBM is very concerned with its customers and the conversion process. In fact, advanced aids offered with System/38 were designed for just that purpose.

I know of nothing within the System/38 program — including our decision to defer deliveries to assure the finest possible performance — that is not dedicated to support IBM's commitment to its customers.

P.M. Foley
President
IBM General Systems Division
Atlanta, Ga.

DPMA Still Fighting Tax

As chairman of the Data Processing Management Association's (DPMA) Sales Tax Subcommittee, I would like to comment on "To Tax or Not to Tax: The Software Question" [CW, Jan. 28].

I also was involved in the panel discussion at the National Computer Conference last June and, like Bob Sherin, was distressed by the poor attendance. However, this has not diminished DPMA's continued involvement in and support for the industry's position of intangibility and nontaxable status.

DPMA has taken the approach that if one company in any state will come forward, we will provide the manpower, documentation and nonlegal expertise to address a specific assessment question.

This approach is working; millions of dollars are being saved in New York State alone every year.

I commend CW for its continued interest in and publicity of this effort.

Steve Vajda
Miami, Fla.

READER COMMENTARY/John A. Postley

Cooperative Approach Produces Best Contracts

The views of Paul J. Outling on software contracts ["Contract Ploys Suggested for Users" and "Beware of 'Mined' Contracts, Attorney Warns," CW, Jan. 28] are so out of touch with reality that they must be rebutted. It seems to me that his are the views of a lawyer seeking to win the case when (not if) it goes to court. As such, they serve the best interests of neither the user nor the vendor.

By attempting to pressure the vendor "to devise a system appropriate for the applications at hand," the user abandons his proper role. It is the user who knows (or should know) more about his needs than the vendor. The user should indeed "specify what the system should do," but he should then work with the vendor in deciding how to do it; otherwise the communications gap may be too great for either to overcome.

Detailed accounting by the vendor sounds like a good idea, and sometimes it is. But if the user intends to hold the vendor responsible for meeting operational schedules and budgets and to penalize him if he fails to do so, then the user must provide firm specifications at the outset and not change them.

And he must accept the fact that the vendor's proposal will include a contingency factor, since he cannot know the solution to every problem he will encounter before he begins. I have met very few users who will or can provide firm specs and equally few who understand the role of a contingency factor in the budget.

A "time is of the essence" phrase in the contract is not a bad notion, but it too must be properly handled. First, the parties must agree that time really is of the essence; if not, then the imposition of time constraints could be detrimental to the final system (sometimes it takes longer to do it right). On the other hand, a performance bond is fine as long as the user pays for it and as long as "performance" is meaningfully defined.

Essentially, if the user wants the vendor to accept liability for any kind of system failure, and especially for consequential damages, he must recognize that the vendor will (at least should) include in the contract an amount representing the probability that damages actually will be assessed. And the contract must also include the means to determine whether the failure was actually attributable to the vendor or to the user himself (in which case the user might have caused damages to the vendor's reputation). It is not unknown that suits are instituted and even won by the wrong parties once in a while.

What kind of a statement is "if you're (the user) happy with your system, you've probably been oversold"? This whole process works best, and sometimes only, if it is approached as a cooperative effort and not a competition, legal or otherwise. Most of the time, a request for proposal (RFP) approach to selecting a vendor for a cus-

(Continued on Page 29)

READER COMMENTARY Robert J. Sherin

Mass. DPers Now Have Avenue of Tax Relief

Massachusetts DPers, who have continued to pay software taxes while the Department of Revenue enters its second year of deliberation on DP tax rule-making [CW, Oct. 15], now have an avenue of relief.

There is strong support within the department — at least for the present — for asking, through formal abatements, that software assessments under the Massachusetts sales tax be nullified. The law is now unevenly applied, with some companies being taxed and others exempted for essentially the same transaction.

Such filings for abatements in Massachusetts can go far in showing solid opposition to the tax, which seems to be a prerequisite to gaining a rightful exemption.

It is noteworthy that the Tax Commission itself has emphasized it will only draft regulations after meeting with the industry in a formal hearing on proposed regulations to be derived from evidence already presented by the industry and from other states' rules.

Filings for abatement would be an appropriate response to the wise warning issued almost three years ago by Roy Freed, a Boston attorney well known in DP circles: "Instead of sitting around for years — ostensibly waiting for the sales tax collectors to promulgate regulations but actually hoping their existence would be overlooked — [DPers] should have been taking the initiative to influence the adoption of a proper approach.

"They should have been on the offensive all along," Freed contended then. Since Freed's comment, little has changed. Sure, organizations like the Association of Data Processing Service Organizations (Adapso) and the Data Processing Management Association (DPMA) took the cue and are at work in opposition, but their biggest problem is getting grass roots support.

As a perfect example, California has collected millions of dollars in software taxes under dubious authority since the early 1970s, yet most DPers there quietly accept the status quo and pay without a whimper.

And what could be more susceptible to arbitrary interpretation than California's onerous Rule 1502, which taxes software but exempts programmers, analysts and technical help?

The software tax is, after all, a tax on the labors of an industry. How broad or how narrow that tax is — and it could be considerable — depends on the authorities' conceptualization of our activities. Are we manufacturing or are we providing a service? And what precisely is software, anyway?

Between state rule-makers who don't know what software is and auditors anxious to post new taxes, the software tax is being pushed forward.

It seems strange that the people best able to shed light on the subject — DPers themselves — have been acquiescent all to often. Massachusetts DPers should seize this opportunity to shape their own futures.

Sherin is president of Nova Computing Services, Inc. in Miami and a nonjudicial legislative advisor for DPMA.

READER COMMENTARY/Don McNeil

The Myth of Software Maintenance

It is said to cost a lot, to consume an inordinate amount of time and to produce unsatisfactory results. It is scorned by management and dreaded by technical staffs. But it is fashionable to babble on and on about it. And everybody's doing it.

The current fad is to call it "maintenance." Now if you believe the myth that software is subject to maintenance, read no further. You probably also believe that programs contain "bugs" (which walk in on their own six legs), that there is a technological panacea for every DP problem and that software production ought to be an artsy-craftsy, touchy-feely, guru-centered occupation.

Everyone is entitled to cherish beliefs, especially regarding harmless myths such as the tooth fairy. Where software is concerned, however, thoughtless acceptance of popular mythology can be costly or dangerous or both. Since some of the worst problems in the DP industry are already managerial in nature, it is especially important that management not buy or propagate additional illusions.

The software "maintenance" myth has not been dispelled by the otherwise healthy trend toward appreciating software architecture and construction as engineering disciplines. Software and hardware may have analogous development methodologies, but there is at least one crucial difference in their end products: *Software does not deteriorate, so it is not subject to maintenance.*

To "maintain" is to "preserve in an existing state." Most software never was any good and hasn't been improved by alteration, so in a sense it can be said to have been maintained, that is, kept awful. If improvement is intended, it might be wise to embark upon evolutionary redevelopment rather than maintenance.

The word "maintenance" is most commonly misused to refer to all of the modifications made to a software system after initial development. You can call it "enhancement" or you can call it "repair" or you can call it "maintenance," but if you proceed to establish a "Maintenance Department," staff it with new hires and dump responsibility for patching production software there, you have been misled by your terminology. The attitude that all post-installation modification is technological janitor work keeps everyone's nose in the dirt. It also produces rotten software.

The notion of maintenance is, of course, relevant to some DP activities. Hardware gets dirty, deteriorates and breaks down, so hardware maintenance is necessary. Data bases, too, are subject to contamination, damage and structural disintegration and must therefore be maintained. Data base and data space maintenance is essential work, but nowadays it can be performed perfectly well by trained paraprofessionals using preestablished procedures.

Apart from these legitimate areas of maintenance, there are the rare cases in which software has been stabilized and is no longer evolving. The programmers who respond to the occasional emergencies which cannot be handled by standard procedures might be said to do "support" or even "maintenance," though the title "production programmer" is more appropriate.

Typical software systems have defects and must be adapted to meet new requirements. They need even more competent care than systems being put together for the first time. Every change to production software must, if it is to be done properly, go through every phase of the software development cycle: *investigation* of the current situation, *specification* of the functional changes needed to serve current or anticipated purposes, *design* of the structural changes that will perform the specified functions, *construction* of the designed changes, *certification* that the changes do everything intended (and nothing unintended), *installation* of the changed software and *evaluation* of the changed system in operation.

And every phase must be planned, documented, checked and communicated to those who need to know. To do less is sloppy.

We can say all this glibly; to do these things is more difficult. An article called "Adopting a System Release Discipline" (*Datamation*, January 1979) reported on how one DP shop was able to organize itself to bring the evolutionary redevelopment of software under control, but each shop should expect to have to design its own methodology for orderly adaptation of software.

There is no single guaranteed formula for success. You are on the right track, however, if every software change you make is thoroughly designed before construction and carefully checked afterward. And, of course, there is no substitute for competent, well-trained staff doing the

(Continued on Page 29)

CENTRAL INQUIRY
WORD

Now one distributed processing system does all four functions at every station.

We know that your remote users need more than one computer function. And we know that you want to avoid a proliferation of different systems to handle them.

That's why our powerful new MFE/IV™ Multifunction Executive system lets your operators perform all four primary office computer functions—data entry, standalone COBOL processing, word processing, and interactive 3270 inquiry to your central mainframe. All on one system. All at once.

Each function is instantly available at multiple display stations with the touch of a key. Our field-proven software packages operate concurrently and independently. And you get optimum use of both central and remote computing resources within a single unified information network.

Save money.
MFE/IV means bottom-line savings for your organization. Since each Four-Phase display replaces several dedicated terminals, you should need fewer of them. And you eliminate the cost and inefficiency of special-purpose systems, underutilized peripherals, and operator cross-training.

Save effort.
Your MFE/IV system keeps up with changing job requirements easily.

In a branch office, for example, while operators key new orders in fill-in-the-blanks formats, the system automatically retrieves and enters customer data from local files . . . price and delivery data from central files . . . and prints invoices. All while word processing and batch processing continue independently at other displays.

Grow step-by-step.
Our family of modular systems lets you grow at your own rate, saving time and money at each step.

Start by installing an economical system combining data entry and file management. Or word processing and batch communications. Or data entry, central inquiry and local processing.

Then grow to meet new needs. Add displays. Add memory. Add peripherals. And add software—with the Multifunction Executive for concurrent operation.

Let us show you how easy your move to distributed processing can be. Call your local Four-Phase Systems office for a personal demonstration. Or return the coupon for our MFE/IV brochure.

Yes, I would like to learn more about Four-Phase MFE/IV systems for:

☐ Data Entry ☐ COBOL Processing
☐ Central Inquiry ☐ Word Processing

Present mainframe and terminals.

Name _____
Title _____
Company _____
Address _____
Telephone _____ Ext. _____
City _____ State _____ Zip _____

Four-Phase Systems, Inc., MS 421F7-M
10700 N. De Anza Blvd., Cupertino, CA 95014
(408) 255-0900

CW 2/19/80

TM–Trademark of Four-Phase Systems, Inc.

Four-Phase Systems
The Distributed Processing Company

HUMAN CONNECTION / Jack Stone

MIS Should Embrace Office, Voice Systems

Along with the changes in the role of the DP department discussed earlier in this series, it appears timely to phase over to the department, in an orderly and controlled manner, the responsibility for all business information technologies. These include "nondata" products for such applications as word processing, voice communications, micrographics and photocomposition — and whatever else will be announced by the time this article is published.

This shift is appropriate for several reasons. First, in the broadest perspective, these newly emerging systems must be considered components of the total management information system (MIS) network for the enterprise. It no longer makes sense that data, communications, office and related systems be selected independently; they have communications tie-ins as well as overlapping functions. A clear example of this is the "universal workstation," an all-purpose terminal now being touted by the business systems vendors that provides access to and control of multifunction systems.

Second, the dollar levels associated with purchases of these nondata business systems by the larger organizations are often very large, in certain cases approaching the hardware costs of the central computer facility. I dare say that, for example, every typing "pool" is a candidate for refurbishment with word processing gear, and there are an awful lot of typists around.

In addition, an enormous variety of systems is available — functions, features, shapes and styles — which suggests that much can be gained through some proper scientific investigation of alternate systems prior to plunking down a check. Yet, the well-established functions of a user needs evaluation, feasibility study, systems analysis and systems design for applications other than data systems are rarely performed (except, of course, by the salesperson on the account). I dread to estimate just how much extra hardware of the nondata variety is already floating around business and government establishments.

Just Another Challenge

DPers are the only ones around who can attack this class of systems problem reasonably successfully. After all, in a general sense, it represents just another set of information system development challenges. Although our record of success with very complex data systems is somewhat mixed, I think there is widespread agreement that we have done a crackerjack job on less complicated ones and nondata-type systems fall into the latter category — at least for now.

Another reason for considering the integration of business systems responsibilities derives from the internal competition that has grown up in many organizations with respect to controlling electronic business systems. In many organizations, responsibilities for data, voice communications and office systems are generally split among three departments, each of which vies tooth and nail for every resource scrap it can dredge out of the corporate coffers. It's difficult to find anyone in the executive lounge who recognizes that resources for the three functions can be traded off against one another to achieve some sort of optimum information systems capability over time.

Centralizing the information system responsibilities will also encourage a needed change of management attitude toward the nondata systems. Prior to the onslaught of micro- and mini-based technologies, the acquisition of office and communications systems was based on cost considerations alone, which was probably OK because the systems had relatively limited capabilities and features. But these days, such systems should be evaluated on cost/benefit bases and support cap-

(Continued on Page 29)

"Because we compete on the basis of service, the Fastrain Printer was the better business decision."

LETTERS

Foggy View of the Issue

C.N. Winningstad's Reader Commentary, "Laying the Blame In Mid-Air Near-Misses" [CW, Jan. 28] merely added more fog to the cloudy air traffic control issue.

The analogy he drew between back-up instruments available to the pilot and the broadband radar that backs up the air traffic controller's computerized primary radar is not appropriate. The pilot's backup instruments are immediately available only inches away from the primaries. The conscientious instrument pilot includes all instruments in his normal scan of the panel, so the transition to "partial panel" does not require extensive mental reorientation.

Not so with the controller. As pointed out in "Controllers Cited in Near-Miss" [CW, Dec. 17], a 400-pound backup radar scope must be physically swung down to a horizontal position. Plastic or paper aircraft identifiers must be manually made up and pushed around on the scope. Yet the controller is expected to handle the same traffic load he had on the tidy, computer-generated depiction that included alphanumeric tags with altitude and even airspeed.

Unlike the pilot's instant transition to "partial panel," the controller's transition to backup takes time (up to several minutes) while a dozen aircraft may have moved several miles. The controller must not only catch up to the new "picture," but must do so with very different inputs. For example, in "backup" mode, altitude data is collected by manual polling via voice radio!

Both the pilot and the controller are essential to safe all-weather air commerce, but comparisons between the two functions are dangerous when they discourage efforts to replace obviously outdated hardware that passengers' lives depend upon.

Let's not point accusing fingers or compare pilot and controller salaries, but get on with replacing antiquated air traffic control equipment. Using today's low-cost minicomputers, we could install a reliable primary and a redundant backup at every Air Route Traffic Control Center for less than the lawyers' fees from one major mid-air.

Alexander B. Trevor
Columbus, Ohio

An Inevitable Task

Thank you for publishing my views on a "computerized" approach to fuel allocation. Judging from the headlines and excerpts used, it would appear that the concepts outlined struck a responsive chord. One reader's reply you published probably hit the nail on the head when he wryly cited reasons the system wouldn't be acceptable.

There is also one additional problem in evidence, a great lack of interest. I don't know how many responses you received, but I didn't get any directly. Apparently apathy will reign and we will soon be burdened by a costly and inefficient coupon system.

At least we tried to expose some potentials for handling an inevitable task in a better way.

Herbert E. Martenson
Columbia, S.C.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

The Software Maintenance Myth

(Continued from Page 25)

work.

Perhaps, after all, the engineering of quality software is inevitably expensive and time-consuming, but it need not be the source of as much dissatisfaction as it is now. If we choose to do so, we can initiate changes that will put us in a world where:

- Unsatisfactory software is supplanted, either by evolutionary or revolutionary redevelopment. (Comprehensive respecification and redesign are usually needed in either case.)
- All software is fully documented to modern standards (retrospectively if necessary).
- Interfaces, not job descriptions, are standardized.
- Software components, not people, are made interchangeable
- Staff efficiency is measured in terms of the number of lines of zero-defect code managed in production, not in terms of the number of lines of new code written.
- Staff effectiveness is judged by the users' view of software product or service quality.
- The best staff is committed to making production software as good as it can be and keeping it that way, no matter how much change takes place.

If that world appeals to you, you can shake up the establishment and make it happen. But whatever you do, don't do "maintenance" unless you really want to keep your software the way it is.

McNeil is an information systems consultant based in Bridgeport, Pa.

Contracts Can Work

(Continued from Page 25)

tom job is not the best approach in either the private or the public sector. In my experience, users rarely know how to write RFPs and even more rarely know how to evaluate "competitive" bids when they are received.

And finally, how can Ostling expect a vendor to adapt to changed user needs (which may actually include misstatements of the alleged "needs" in the first place) without renegotiating the contract?

It has been my experience that vendors and users alike will try to include improper clauses in sofware contracts. Sometimes such clauses attempt to take advantage of the other party and sometimes they are just boiler plate that one party (usually the user) wants to include because it is a contractual "standard" of his organization (even though it may have nothing to do with software).

May I suggest that the simplest and most effective procedure of all might be the following: If you don't trust the other party, don't sign a contract with him; if you do trust the other party, try to develop a contract that is as fair to both parties as you can make it. In the final analysis, any contract is worth only what the parties want it to be worth. If both parties truly want the contract to work, it will.

Postley is a Los Angeles-based consultant in domestic and international business strategy.

MIS Scope Expanding

(Continued from Page 25)

ital investments whose return may be spread over a period of years. This perspective also helps to justify one-time charges for analysis, development, installation, training, documentation and so forth.

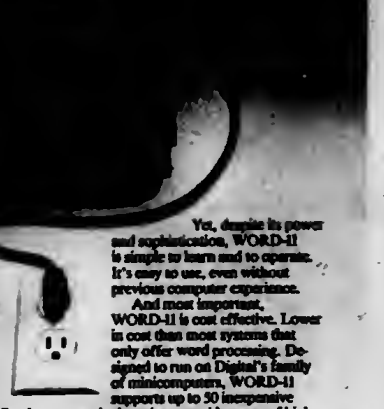
Some Reservations

However, let the record here state that 1) I am not in favor of any increased responsibilities for the DP group unless top management comes across with the resource goods to discharge these changes: namely, the transfer of people, budget, space and whatever else is associated with the switch, *plus* more budget for additional resources as may be necessary to accomplish the expanded mission in an acceptable manner; and further, 2) I do not support any change until the current DP operation has its full complement of resources and is under control.

I recognize that a lot of DPers feel that the systems burdens they are currently carrying are enough and they choose not to add any more. But my answer is that there is only one information systems network and there should be only one information systems department to develop and operate that network.

"They Decided to Keep Me On. The New Computer That Replaced Me Couldn't Run Out for Coffee and Sandwiches."

Responsive Word Processing
Take Our Word For It. WORD-11.



WORD-11 is powerful word processing. Responsive power proven in hundreds of installations in major banks, universities and Fortune 500 companies around the world. And it has demonstrated a successful record of reliability and effectiveness.

WORD-11's sophisticated features provide a variety of useful applications, including text search and replace. User defined keys. Comprehensive list processing. Multiple dictionaries for spelling error detection. User controlled hyphenation. And, naturally, all the standard word processing functions.

WORD-11 is a mature, finely-tuned word processing system that runs concurrently with data processing. Instead of detracting from EDP capabilities, WORD-11 enhances the overall productivity of the system.

Yet, despite its power and sophistication, WORD-11 is simple to learn and to operate. It's easy to use, even without previous computer experience.

And most important, WORD-11 is cost effective. Lower in cost than most systems that only offer word processing. Designed to run on Digital's family of minicomputers, WORD-11 supports up to 50 inexpensive terminals and uses a wide range of high speed and letter quality printers.

As a Digital OEM, DPD provides turnkey solutions for both word processing and data processing applications. Call us today for more information on WORD-11, or for a system configuration to meet your needs. Or contact our overseas distributors.

Data Processing Design, Inc.,
181 W. Orangethorpe Ave., Suite F,
Placentia, CA 92670. (714) 993-4160.

Specialists in digital minicomputer sales and software applications.

Data Processing Design, Inc.

Management Information Services PTY. LTD. Melbourne, Australia — Jeanie LTD. Bristol, England — Systems LTD. Leeds, England — Microsoft Computer Services PTY. LTD. Sydney, Australia

'We've Completely Eliminated Power Consumption on This System.'

THE TAYLOR REPORT/Alan Taylor

Datapro Results Raise Verification Questions

The publication of some 9,537 individual product ratings by Datapro Research Corp. last month was accompanies by the great annual hoopla over the so-called Honor Roll of 44 of the 335 products reported on, as usual.

This year it was also accompanied by derogatory comments about product manufacturers, both those who have cooperated with Datapro and those who apparently have not, and users should be very careful before using these thousands of numeric ratings whose basis has not been verified.

The vendors who have apparently not cooperated (by not providing figures as to how many of their products are in use) find the absence of such data is completely attributed to their failure to get the figures to Datapro. No mention is made of any possible failure on Datapro's part to actively seek the figures or cooperate with the vendor in other ways.

The vendors who have provided information find it singled out in the notes as "completely (sic) unverified," and the survey user is warned at least 10 times about the particular danger of believing such unverified material.

However, Datapro does not indicate what type of verification was offered or attempted, nor does it indicate how the much more numerous figures produced by the Datapro staff (which are published without any such caveats) were verified before publication.

Derivation of Ratings

A Datapro rating is based upon a small, uncontrolled sample of responses to a largely ignored survey that isn't even addressed to product users. (It goes to some recipients of a free publication.)

These responses are then mathematically massaged within Datapro and published without verification of any intrinsic accuracy. The numbers are intended to "pinpoint the ... weaknesses of competing products," the publishers say.

Verification of the numbers' accuracy to match such advertised claims would entail, at the very least, a check of the accuracy of the returns against a group of known users as well as an independent check on the mailing and returns received. It would also involve checking out the comparative accuracy of, for instance, the "use of excessive resources" in Datacom/DB (a product the survey found universally "excellent") vs. the same ratings in the competitive products.

Datapro publishes, and profits from, the material for this use without attempting verifications and seems to use the producers of the packages as a screen to hide this.

One Example

For example, in the survey, Datacomm/DB producer Applied Data Research, Inc. is shown as one of the firms that did not supply the requested information about the size of the user base. A phone call to an 800 number got me the information immediately (about 200).

But I also learned that Datapro had substantial reason to believe that prior ratings of this product were inaccurate as published. No hint of this reached Datapro readers through Datapro, nor did any indication as to the storm of protest from other industry sources that the former ratings had produced.

Cooperation is a two-way street. If Datapro is unwilling to cooperate, it has no right to expect cooperation or to claim that the published ratings are any more accurate than they have been verified to be, given mutual cooperation.

© Copyright 1980 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for noncommercial purposes may be made provided copy carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.

Datapro 70

The EDP Buyer's Bible ... since 1970

Over 100,000 EDP professionals at 12,000 locations in 53 countries rely on it every day. Shouldn't you have the same advantage?

Datapro 70 can help you make better EDP decisions — help you reduce your EDP costs and avoid far-reaching mistakes — by providing the reliable and unbiased information necessary to improve your product selection and usage, system planning, competitive analysis, current awareness . . . and much more.

THREE VOLUMES • MONTHLY SUPPLEMENTS • TELEPHONE INQUIRY SERVICE • MONTHLY NEWSLETTER

Computers | Communications
Peripherals | Media/Supplies
Software | Suppliers

Over 2300 fact-filled pages of independent, objective reports; updated monthly by Datapro, for people who need to know.

- Detailed Product Evaluations
- Comparison Charts
- User Ratings
- Current Pricing
- Product Operation
- Photographs
- Product Perspective and History
- Management Level Presentations
- Technical Details
- Tutorials
- Selection Guidelines

Our 30-day Trial Opportunity: No risk, no purchase obligation

You can have *Datapro 70* in your office for 30 days, with no purchase obligation. Use it to investigate and evaluate hundreds of new products, compare costs, performance, user ratings, specs, competition, and more. Shouldn't you see for yourself how *Datapro 70*, the acknowledged EDP Buyer's Bible, is saving time and money for over 100,000 of your peers every day?

☐ Please send me information about using Datapro 70 on trial, with no obligation.

Name _____ Title _____
Company _____ Phone _____
Address _____
City _____ State _____ Zip _____

datapro
DATAPRO RESEARCH CORPORATION
1805 Underwood Blvd.
Delran, NJ 08075 • (609) 764-0100

As In-House Development Slackens

Report: Prepare DP Staff for Packages

By Marcy Rosenberg
CW Staff

PENNSAUKEN, N.J. — A shift from developing programs in-house to acquiring software from outside suppliers can spell long-term labor cost savings to a user organization, but may leave its technical DP personnel quivering about their job security.

So unless psychological issues related to software procurement are addressed, high employee turnover will persist as technical personnel continue to buck the trend to purchased software, viewing it as an unfavorable reflection on their abilities.

In citing this problem, Auerbach Publishers, Inc. in a recent report also suggested some strategies for preparing DP personnel for software acquisitions. Among them:

- Explain the anticipated impact of planned procurements on the roles of the DP staff.
- Train personnel for software evaluation.
- Plan for the transition from procurement to installation.

Shift in Responsibility

As more user organizations turn outside for systems and applications software needs, the role of in-house DP personnel will shift away from program development to more responsibility for procuring, installing and administering externally developed packages, the report said.

To ready staffers for this changing role, corporate management should directly communicate its future software acquisition plans to DP employees early in the game, the report advised.

However, lack of communication about DP planning is more often the case. The report outlined several reasons for this: management fears its DP strategies will leak to competition; the overhead associated with disseminating information to a large staff is great; and the plans themselves may be tentative and subject to change or cancellation.

Any of these factors could justify a closed-mouth stance in some cases, especially when the goal of a package procurement is to trim the number of in-house staffers. But as the report pointed out, very few software procurements lead to a net reduction in staff and when they do, the cuts can often come through attrition at a not unreasonable cost.

Despite the negatives, early communication of software plans has its advantages and should not be overlooked. Involving the technical DP staff at the ground floor of procurement planning serves, if nothing else, a psychological need. "It is easier for the technician to tune out extra information than it is for him to deal with the frustration of knowing too little," the report explained.

To what degree should technical personnel be involved in acquisition plans? According to the report, these employees should be told why management is considering a software procurement, when the software will be acquired and what their responsibility in the procurement process will be.

The report also stressed that management should take steps to assure staffers that their skills will be needed even after the product is installed.

Before the technical staff can effectively participate in the evaluation effort, how-

(Continued on Page 32)

Cullinane Updates IDD

WELLESLEY, Mass. — Release 2.0 of the Integrated Data Dictionary (IDD) combines user identification with password security and allows users to customize the syntax by adding unlimited key words, according to its vendor, Cullinane Corp.

The release, which runs on IBM 360, 370, 30 series and 4300 systems, requires 60K bytes of resident memory — twice as much as IDD Release 1.2, introduced about two years ago. Security functions in Release 1.2 were limited to user identification only, a spokeswoman noted.

By providing two levels of security, Release 2.0 reportedly prevents unauthorized updates of memory maps, programs, records of file modules. These entities can be tailored by the user to contain any number of key words, Cullinane said. The earlier version of IDD had a fixed-form length and could be used only with dictionary and system entity definitions.

Cullinane claimed Release 2.0 offers added flexibility by permitting each element to be defined with up to five data formats plus definitions of communications entities such as terminals, lines and destinations. These entities are available for documentation purposes, to any teleprocessing monitor, the spokeswoman said.

With Release 2.0, users can enter record definitions in Cobol record format without needing to define every element. The text-editing facility was also extended to allow manipulations of comments and module source code on a line-by-line basis.

By comparison, text editing in Release 1.2 limited users to adding or deleting comments and module source code, the spokeswoman explained.

IDD 2.0 operates under the MVT, MFT, SVS, MVS, VS1, VS2, DOS/VS, DOS/VSE and VM/CMS operating systems. It can function as a stand-alone data resource manager or as part of Cullinane's data base management software family.

A one-time license fee for IDD 2.0 costs $15,000. A 10% annual renewal fee covers new software releases, maintenance and documentation, Cullinane said from 20 William St., Wellesley, Mass. 02181.

Mathematica Eases Limits In Latest Release of Ramis II

PRINCETON, N.J. — Many of the limits on files and records in the Ramis II data base management system (DBMS) have been extended or removed by Mathematic Products Group, Inc. in Release 2.0.

For example, while the earlier release allowed a record to contain up to 256 fields and 1K byte, Release 2.0 expands those limits to 32,000 fields and 90K bytes, a spokesman said.

In addition, the maximum number of bytes per level was extended from 1K to 4K; the number of fields per level was increased to 32,767 from 127; the number of virtual levels per file was increased from 10 to 22; the number of concatenated data bases that can be handled expanded from 12 to 25; and the number of bytes per library file entry, formerly 1K, is now unlimited.

Ramis II Release 2.0 also provides a PROFILE command that allows a set of user-defined values to be assigned to system parameters. The values can be automatically invoked when Ramis II is initiated and may be modified at any time by a single-word command, the vendor noted.

Release 2.0 also extends the network structure capability of the DBMS to let the system's report writer automatically relate non-Ramis II files with Ramis II files. This ability to use data from master files maintained in Ramis lends itself to applications where Ramis is used to generate new reports from systems developed prior to its installation, the spokesman noted.

Fixed work areas in memory have now been replaced by variable work areas that are acquired dynamically as the need arises. This permits Ramis II users to handle larger

(Continued on Page 32)

ADAS relieves the agony of Slipped disk

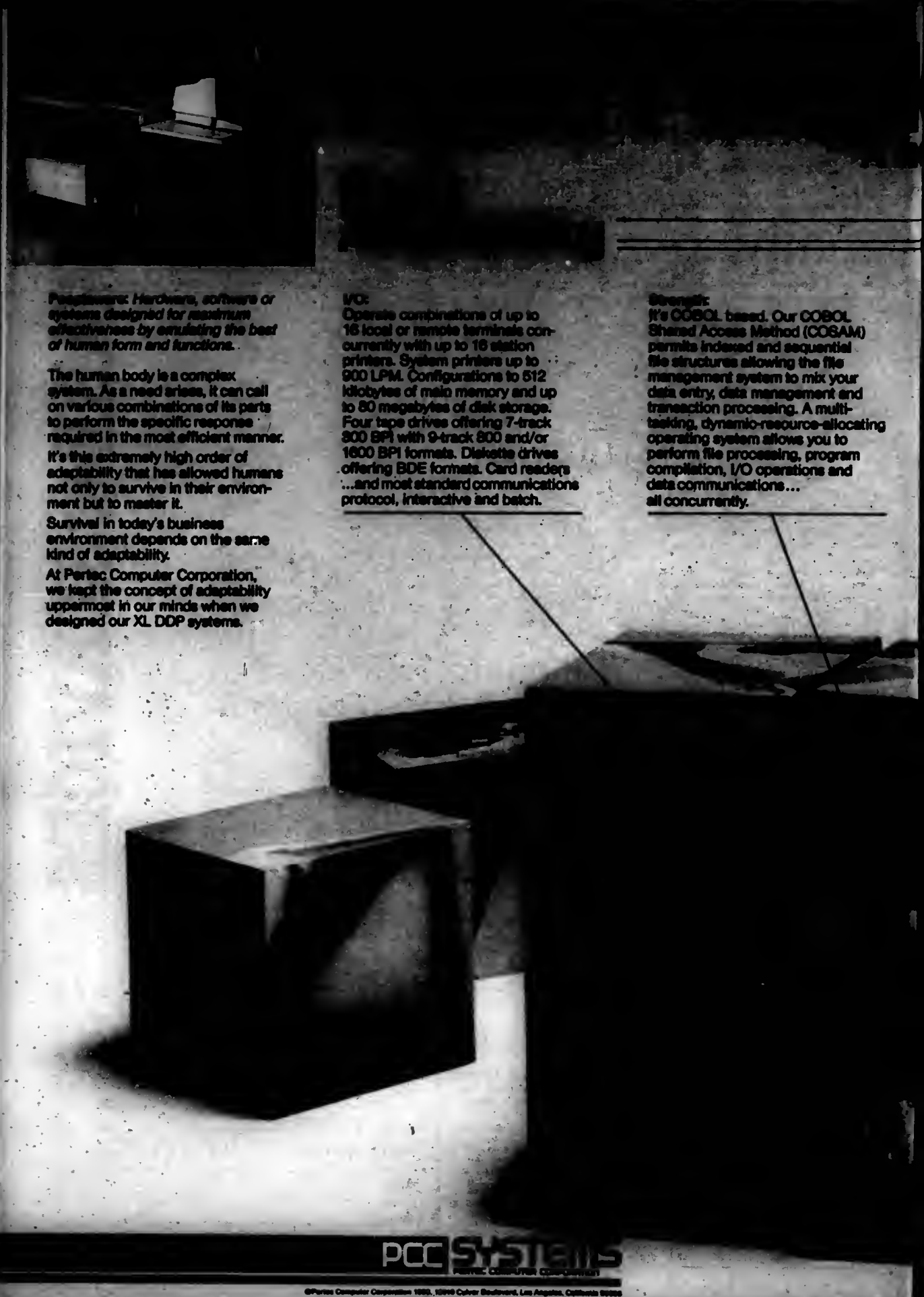
Too much disk space can slip into wasteful reserve with IBM DOS, DOS/VS and DOS/VSE installations. ADAS can make available this wasted space, increase your processing power, eliminate a DASD upgrade.

ADAS is a simple-to-use, highly transparent system for efficient disk space management. ADAS automatically assigns file space from available areas on disk, eliminating the manual task of locating unused space; returns to use up to 30% of overall disk space, up to 100% of SORT and compiler work space; prevents overestimation of space needs by truncating space automatically after files are created. ADAS supports 2311, 2314, 3330, 3340, and 3350 compatible disk drives; supports all file types; reports when and where each file is used; offers disk pool management facility; provides automatic secondary allocation; offers device and file independence; prevents deletion of unexpired files; makes JCL completely partition independent. And ADAS is continually being enhanced with other major features. Write or phone for more facts and a free trial offer.

Universal Software Inc.
Brookfield Office Park
Brookfield, CT 06804
TEL: (203) 792-5100

Our products have won the award 5 times

☐ Send me detailed literature. ☐ And send facts on all your software products.
Name _____ Title _____
Company _____ Phone _____
Address _____ CPU _____
City _____ State _____ Zip _____
CALL TOLL FREE: 800-243-0542



©Pertec Computer Corporation 1980, 10916 Culver Boulevard, Los Angeles, California 90230

Skills:
Downline-load compiled programs, source code or data files to other XL systems. Either conversationally or in batch mode, the XL transmits and receives required information to and from host computers and terminal systems. It can concurrently capture and intelligently edit data, query and manipulate files, generate information reports and communicate with other XL Systems.

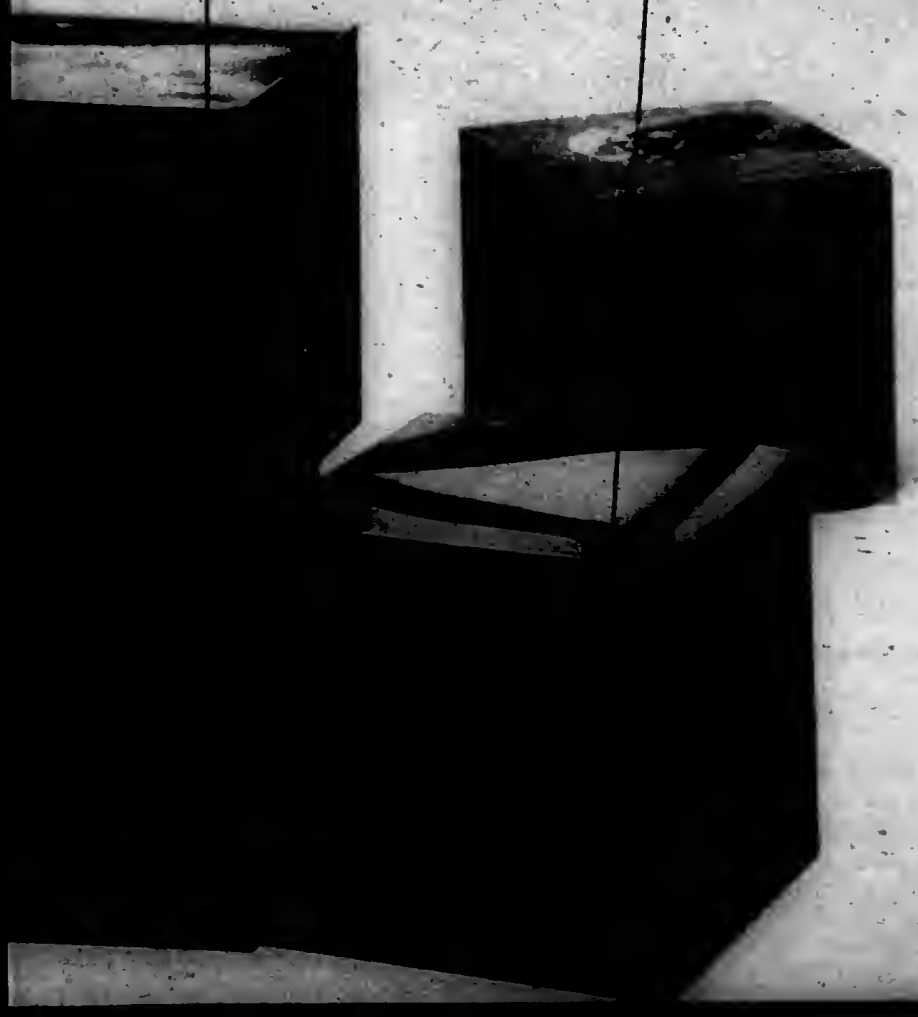
Speed:
The end-user can combine the XL system's skills and strengths to manage throughput quickly and efficiently. It contains multiple microprocessors —all performing simultaneously— at speeds up to 160 nano-seconds. State-of-the-art architecture makes your XL application perform!

Adaptability is just one more example of how Pertec's Peopleware makes our DDP systems more effective. And your DDP buying decision simpler.

XL20 and XL40 are products of Pertec Computer Corporation, an international company that designs, manufactures and services computers and computer equipment.

For more information write
Pertec Computer Corporation,
12910 Culver Boulevard,
Los Angeles, California 90066, U.S.A.
Or call toll-free 800-331-1001 in the Continental U.S.A. (In Oklahoma, call collect 918-664-8300.)

Pertec Computer Corporation
12910 Culver Boulevard,
Los Angeles, California 90066, U.S.A.



Report Probes Psychological Effects of Packages

(Continued from Page 31)

ever, they will need to know not only the intended role of the software from a technical standpoint, but also how it will fit into long-range corporate plans, who will use it and what costs are involved.

Knowing cost and benefit trade-offs will often stimulate evaluation team members to consider aspects of package capabilities they may not otherwise take into account, the report observed.

Along these lines, then, management should at least break out cost figures associated with the CPU, storage requirements, channel utilization and personnel salaries and overheads, the report recommended.

In addition, management should inform technical personnel of the extent to which the company can commit itself to a new package beyond initial license costs. For example, some firms will want to modify standard packages; those that don't or can't will more likely need an off-the-shelf package.

Technical Preparation

Before the evaluation process begins, staffers will of course need some technical preparation in either applications or systems software, the report noted. Beyond knowing the application area for which a package is sought, the evaluation team should also be counselled to avoid basing selections solely on the shortcomings of the existing system.

Since few university M.B.A. or graduate programs in information science expose students to a variety of application areas, the report suggested as alternative sources for technical training public seminars and literature advertised in trade publications or through direct mail solicitations by computer book clubs and private publishing houses.

In the systems software area, training in not only the concepts but also the inner workings of such products is also a must, according to the report. And for these kinds of software products, representatives from a number of different applications programming groups within the user company should participate in the evaluation.

This suggestion is based on the fact that operating systems and utilities, data base management systems and teleprocessing monitors, though frequently selected by a systems programming group, are often transparent to applications programmers.

After narrowing the number of candidate packages, the extent and type of vendor training offered becomes important, both as a way the evaluation team can learn to define selection criteria and as a selection criterion itself. As the report pointed out, "If the evaluation team cannot learn from vendor courses on package use, how will other personnel in the organization gain this knowledge?"

Members of the Team

Given that an evaluation team's charter is defined and the steps for preparing to do an evaluation known, the next logical question is, who should make up the team?

The report recommended a mix of representatives from programming groups within the DP department. For example, one or more individuals familiar with the application and/or a systems programmer with sound background in package internals and algorithmic considerations should participate.

Also, teams investigating packages that will not be transparent to all applications should include a representative from the user department in which the package will be installed.

Even after a package is selected, the technical evaluation team should continue to play a part in installation and maintenance. Because these staffers have gained considerable knowledge about the acquired software, they can be called on to help design package modifications and to train other programmers and user departments in its capabilities and use.

The report suggested that, in this support role, only one staffer serve as liaison with users and with the package vendor to establish good rapport with both parties. Developing a one-to-one relationship can also minimize unnecessary communication with the vendor.

Since the technical liaison is familiar with the installed software, he may spot "software problems" that result from user misuse and correct them without needing to involve the vendor unnecessarily, the report observed.

The report emphasized that involving in-house technical staffers early in the software procurement process also means giving these individuals some power to veto packages that fail to meet basic acceptance criteria.

Titled, "Preparing the Host Environment for Software Packages," the report is a supplement of Auerbach's Computer Programming Management volume that costs $155 per year. The report can also be purchased separately for $10. Auerbach is at 6560 N. Park Ave., Pennsauken, N.J. 08109.

Codasyl Asks For Comments

ARLINGTON, Va. — The Common Operating Systems Command Language (Cocl) Committee of Codasyl is seeking comments on its proposal for a standard time-sharing command/batch job control language.

The proposal is detailed in the latest version of the *Cocl Journal of Development*, available for $6 from the Materiel Data Management Centre, Department of Supply & Services, Ottowa, Ont., Canada K1A0S5.

The committee also needs additional members. Anyone wishing to participate in committee activities or to offer comments on its work should contact the committee secretary, William LaPlant Jr., P.O. Box 2130, Arlington, Va. 22202.

Ramis II DBMS Gets Updated

(Continued from Page 31)

files, the spokesman said, and minimizes the problem of underutilization of memory which often occurs when a fixed amount of core is allocated for jobs.

Multiple program control block support to the intelligent Ramis II interface with IBM's IMS is another feature added in Release 2.0. Previously, users could only access one block at a time, according to the spokesman.

Release 2.0 uses essentially no more memory than the earlier version, the spokesman claimed. A fully configured Ramis II DBMS running on an IBM 370/115 under DOS/VS, for example, uses a 65K- to 80K-byte partition; running under MVS on an IBM 3033MP, a typical Ramis II configuration requires 512K bytes of memory, he said.

For large CPUs — defined by the vendor as IBM 360/65s and larger, 370/155s and larger, all 30 series processors and 4341s — Ramis II Release 2.0 leases for $1,120/mo including maintenance or can be purchased for $43,000 to $100,000, depending on options.

Smaller user installations — those that run IBM 360/50s or smaller 370/148s or smaller or 4331s — can lease Release 2.0 for $575/mo including maintenance or can purchase the DBMS for $22,000 to $75,000.

Maintenance for purchased systems costs 10% of the purchase price after the first year. Mathematica said from Princeton Office Park, P.O. Box 2392, Princeton, N.J. 08540.

HP 3000
PACKAGE SYSTEMS

ACCOUNTING
- Payroll, Personnel
- Labor Distribution
- Accounts Receivable
- Accounts Payable
- Fixed Assets
- General Ledger

MANUFACTURING
- Order Entry
- Bill of Material Processing
- Inventory & Order Status
- Material Requirements Planning
- Shop Floor Control
- Capacity Reporting

DISCOUNTS
- Up to 24% volume discounts on hardware-software system sales
- Unlimited usage software agreements on multiple-site hardware sales

LEASING
- Qualified customers can get up to 7 years, as low as 7.5% per annum.
- Hardware only or package hardware-software leasing.

DATA SYSTEMS FOR INDUSTRY

DOS/VS Terminal Printer Spooling
BIMSPOOL
Retrieves batch print from POWER/VS queue, converts and prints on 3270-type terminal printer via CICS*. May be used to eliminate RJE printers. $4000 or $200/mo.

DOS/VS Console Hard Copy File Display
BIMDSLOG
Used by operators or programmers to review DOS/VS messages via CICS* without tying up system console. $720 or $36/mo.

*Now available for SHADOW also

BIM B I MOYLE ASSOCIATES
4300 LYNDALE AVENUE SOUTH
MINNEAPOLIS MN 55409
(612) 822-3061

DOS/VSE and CICS/VS Consulting, Contract Systems Programming, and Program Products

DPL for
DEC system-10
DEC system-20
users

YOUR PROGRAMMERS CAN BE 5 TIMES MORE EFFECTIVE

DPL is a high-level applications development language and data base management system. It reduces program code up to 90% to give you fast development and easy maintenance, a proven success in more than 65 installations. For more information, call or write

NATIONAL INFORMATION SYSTEMS, INC.
20370 Town Center Lane, Suite 245
Cupertino, CA 95014
Telephone (408) 257-7700

Performance is Critical. Billings Delivers.

SOFTWARE
Programmers' Pack
- Billings Operating System
- Fortran with overlays
- Cobal with overlays
- Macro Assembler
- B Basic
- E Basic
- Utilities
- Assist Screen Handler

Word Processing
Business Accounting

Immediate Shipment

FEATURES
Memory—64 K Bytes RAM with Memory Parity standard.
Screen—Twenty-five lines, 80 characters
Protected Fields—Two-thirds Intensity—
Graphics—A 32-key line drawing set
Microprocessor—Z-80

SPECIFICATIONS
Clock—4 MHz
Power—110 or 220 VAC, 50 or 60 Hz, 2 amps
Cabinet—Molded structural foam
Cursor—Variable size and blink rate
Ports—Two RS-232 Serial Ports (HDLC or SDLC compatible)
One Eight-bit parallel printer port
Key Board—94 keys (upper and lower case), including 16 special function keys and numeric pad.

'We have the best piece of hardware in its class'

President Roger E. Billings

BC-12F
320K Bytes Floppy Capacity

$6,540

BC-12FD
640K Byte Floppy Capacity

$7,290

BC-12 DF1M
1 Mega Byte Floppy Capacity

$8,910

BC-12 DF2M
2 Mega Byte Floppy Capacity

$10,415

These prices include software.

For immediate shipment contact your nearest dealer.
DEALER INQUIRIES INVITED

Billings

18600 East 37th Terrace South
Independence, Missouri 64057
816-373-0000

Temple University Offers Double Benefit

Finance Class Gets Hands-On Experience

By Richard Klein
Special to CW

PHILADELPHIA — Business degree holders with a working knowledge of computers are becoming more attractive to prospective employers. So when Temple University implemented a computer-based financial modeling system for teaching purposes, students gained a double benefit — a grounding in business finance and an opportunity to work with computers.

In October 1978, Temple University purchased the use of the Interactive Financial Planning System (IFPS) from Execucom Systems Corp. of Austin, Texas, with the help of funds from a Merrill Lynch Foundation grant.

According to the agreement with Execucom, IFPS may be used for teaching support activities, university-funded research, university administration and executive development programs. It was able to secure the system at a substantially reduced cost because it would be used solely for academic purposes.

Used in Courses

Temple has a Control Data Corp. Cyber 174 with extensive time-sharing capabilities. Its computer center has operated and maintained IFPS without any significant problems.

Since the fall of 1978, it has used the system to teach computer-based financial modeling in several courses. In particular, it uses IFPS as an integral part of one advanced undergraduate and two advanced graduate (M.B.A.) courses in business finance. This academic year, about 100 students are working on individual projects using IFPS.

Temple's experience with IFPS has been highly favorable. Its students find IFPS can be self-taught quite easily, and they are able to gain a substantial degree of self-sufficiency within a short period of time. Nevertheless, IFPS is a highly sophisticated system, and many part-time graduate students employed in the computer field have been impressed with the capabilities of IFPS.

Execucom has supplied Temple with updated and revised systems every six months. The firm's technical assistance and support facilities have been excellent, and their responses to the university's needs have been immediate.

I personally attended the advanced programming and the risk analysis courses given by Execucom in Austin. In addition, Execucom offered an informative one-day seminar last January for the business school faculty, here.

Student Orientation

My field is finance; most of my students have had only one computer course. In introducing IFPS to these students, I begin by discussing some of the concepts of financial modeling and two or three features of IFPS. I then require each student to study the *IFPS Tutorial* (a self-instruction manual), and to sit down at a computer terminal and duplicate the results of this manual. The purpose of this exercise is to overcome any fear of the terminal and to give the user a positive learning experience.

Each student chooses an individualized project in which IFPS will be the integral element. In lieu of a typical term paper, the student constructs a financial model, validates that model and demonstrates its usefulness. The project must include the construction of an IFPS model, the use of the report writer, the presentation of the results and a written analysis of the results. We believe this approach encourages creativity and self-reliance.

To help students select a project, examples of solved cases are on file in our library. To date, students have constructed financial models in such areas as budgets and projections, real estate investment analysis, mergers and acquisitions, capital budgeting, leveraged leases, profitability and projections of departments in nonprofit hospitals and energy cost analysis.

IFPS has been a very useful tool in teaching business finance. For instance, the discussion of discounted cash-flow techniques in capital budgeting is facilitated by the availability of the IFPS built-in financial routines of Net Present Value and Internal Rate of Return.

Furthermore, my students can comprehend the concept of sensitivity analysis in capital budgeting when I refer to IFPS's "What If" capability: "If sales were down by 10%, what would happen to the return on investment?"

Monte Carlo Capabilities

The teaching of computer simulation for capital budgeting purposes is greatly enhanced by the "Monte Carlo" capabilities of IFPS. This feature permits hands-on experience and is an exciting learning tool. The ability to actively construct a financial simulation using triangular and normal probability distributions, for example, have provided students with new tools for the solution of problems of capital budgeting under risk and uncertainty.

Because of my emphasis on the ability to communicate information effectively to top management, my students have learned how to utilize the IFPS report writer. The formatting of reports is important, and this feature is quite easy to use. Recently, a number of completed projects have incorporated the use of the Plot (graphics) routine.

In essence, IFPS has furnished us with the ability to integrate computer and information science in teaching finance.

Student Reaction

We have used IFPS with two groups of students, undergraduate and graduate (M.B.A.). Although many students have an initial fear of using computers as an integral part of a finance course, they soon get over this fear because of the English-like modeling language of IFPS. Students taking the finance courses involved are requested to purchase the user's manual.

Many students using IFPS have discussed the system in job interviews. Some have even included the ability to write computer-based financial models in their resumes. A few have commented that they were offered jobs in part because of their familiarity with IFPS.

In many cases, students have used IFPS in conjunction with other graduate courses, such as those in the areas of real estate, business policy and accounting. Once individuals become somewhat familiar with IFPS, they are self-motivated to use it in other contexts.

In the near future, I plan to introduce a graduate course in financial planning in which the IFPS project will be the central focus. The course will include elements of strategic planning and economic forecasting as well as financial modeling using IFPS.

Klein is an associate professor in the School of Business Administration at Temple University in Philadelphia.

DISC PACK FILING

Wright Line's Optimedia® Cabinets provide a safe, convenient, cost effective method of filing all sizes and types of disks. Full suspension roll-out shelves simplify the handling of heavy packs. Custom configurations allow magnetic tape or other media to intermix with disks in the same cabinet. For further information, circle the readers' service number or write: Wright Line, Inc., 160 Gold Star Boulevard, Worcester, Massachusetts 01606.

FOR DATA PROCESSING ACCESSORIES AND SUPPLIES, YOUR single source with super service

A Subsidiary of Barry Wright Corporation

"Why do you think SUN DATA is the fastest growing IBM GSD dealer?"

John H. Crilly, President Sun Data, Inc.

If you say darn good delivery schedules, I agree. Sun Data can put the computer you want, where you want it, in weeks—not months! Our on-the-spot inventory is an industry first...

If you say fiercely competitive pricing, I agree again. Sun Data meets any other pre-owned equipment dealer's price head-on.

If you say unequalled engineering 'moxie', I agree 100%. Sun Data's technical specialists are veteran IBM system engineers. They refurbish Sun Data acquisitions to a "T".

If you say what makes for Sun Data's rapid success is a superb record of satisfied customers, I agree again. A very large percentage of our business is by referral and that makes us proud as peacocks. For these reasons, I personally feel that Sun Data may very well be the number one IBM GSD dealer by the end of 1980.

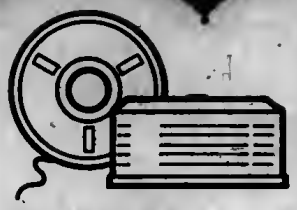
So the next time you need pre-owned equipment, call Sun Data. You'll be doing business with the fastest growing hardware dealer in the USA.

Sun Data, Inc. (800) 241-9882

6185 South Buford Hwy., P.O. Box 100046 • Atlanta, Ga. 30048 • (404) 448-6116

STAM

Put Your Shared Devices Under the STAM Umbrella



IBM OS/MVS

STAM is a stand alone system enchancement that directs the allocation of shared mountable devices (tape and disk) in a multi-system environment.

STAM Benefits:

- Increased Global System Throughout
- Maximum Device Utilization
- Eliminates Labor Intensive Practices
- Eliminates Human Error
- Transparent to Users
- Eliminates Costly Job Cancellations, Reruns, ABENDS and Probable Data Loss
- Defers or Eliminates Additional Device Acquisition

STAM Capabilities:

- Complete Audit Trails
- Preferred, Dedicated and Asymmetric Allocations
- Automated Replies for Allocation Recovery
- Global VARY, SWAP and Device Status
- Global Device Names
- Global Operator Alert
- Global Release/Shutdown
- Does Not Require Operating System Modifications
- Does Not Require an IPL

STAM is available for a free 30-day on site evaluation. Also available from SMM is SDSI for Shared Data Set Integrity. This system prevents concurrent updates on data sets shared by multi-systems and it eliminates device reserves and lockouts.

For more information on STAM and SDSI please call or write SMM.

A Product of

Duquesne Systems

Represented by

Software Module Marketing

Crocker Bank Bldg/ Penthouse
1007 Seventh Street
Sacramento, CA 95814
(916) 441-7234
Telex 377-314

Ansi Issues Catalog Of Current Standards

NEW YORK — The American National Standards Institute (Ansi) has issued its 1980 catalog listing about 10,000 current standards approved by the institute.

Standards contained in the 180-page publication cover dimensions, ratings, terminology symbols, test methods and performance and safety requirements for materials, equipment, components and products in information processing and other fields, Ansi said.

The 1980 catalog is divided into two major sections. One lists titles of Ansi-approved American National Standards alphabetically. Designation, price, and applicable discount information are included with each title.

Subject Index

The second section compiles the designations of all standards listed in the subject section, referencing the subject heading under which the complete entry appears. It also gives price and applicable discount information, Ansi said.

Both sections indicate whether the standard is new to the 1980 edition.

The catalog is offered free to Ansi members and costs $7.50 for nonmembers, Ansi said from 1430 Broadway, New York, N.Y. 10018.

Alternative to IBM's DL/1 Out for Commercial Sites

OMAHA, Neb. — A data base management system (DBMS) for IBM DOS, DOS/VS and DOS/VSE users is available from Consolidated Business Systems, Inc.

Called DA1, the package is said to be an alternative to IBM's DL/1. DA1 was designed for commercial installations and offers inverted, direct or sequential access to data structures for applications requiring random or indexed processing.

Sequential data structures are supported for disk, tape and unit record, Consolidated Business Systems said.

Data stored in inverted or direct structured may also be accessed sequentially. This allows users to retrieve large sections of data, the vendor noted.

DA1's options include multitasking support, multiple partition support and logging. Space used by deleted data is automatically recovered, according to the firm.

DA1's data definition language allows fields to be defined in a hierarchical manner. Data is independent from the field level, the vendor said.

Subsets of the data base definition can be selected to minimize overhead in specific applications, the company noted, adding that buffer sharing can also be used to minimize size.

The data manipulation language accepts a set of calls from a host language, such as Cobol. A reference manual is included to cut training time, according to the vendor.

DA1 takes up 12K bytes of main memory plus the user's buffer/table space. A perpetual license for DA1 costs $34,850. A perpetual license for the utility programs costs.

The package can be leased for $492.50/mo and the utility package for $96.60/mo, Consolidated Business Systems said from P.O. Box 6183, Omaha, Neb. 68106.

PDP-11 Gains NC Plot Package

DALLAS — A plotting program for University Computing Co.'s (UCC) UCC-APT numerical control (NC) processor is available for Digital Equipment Corp. PDP-11 users.

Called UCC-NC-PLOT II, UCC's program will generate and display a graphic representation of the cutter path to help the programmer verify the accuracy of a part program, the vendor said.

The plotting program is a UCC-APT postprocessor designed to generate a graphics data file to be displayed using the appropriate graphics display utility and on-line plotter. This graphics file contains the tool position data with default scale factors and the user defined frames.

The file can be plotted interactively with the utility routine, according to UCC.

The interactive option allows the user to change the view, scale factor and window selection of a plot to verify machining of the part, as well as alter translation and rotation.

The program costs $3,500 and requires a minimum of 25K words of memory on the PDP-11, UCC said from UCC Tower, Exchange Park, Dallas, Texas 75235.

If you've encountered a *CULPRIT* who has no **ANSWER/2** EASYTRIEVE you need . . . . .

The Data Analyzer

Provides complete Data Retrieval and Presentation Capabilities PLUS:

- New, more Powerful and Flexible Macro Processor
- New On-Line CICS Data Retrieval Capability
- New On-Line IMS/DB/DC Retrieval Capability
- Free Form Language
- Extensive Graphic Capability
- Major Data Base Interfaces
- Regression Analysis Capability
- New Extended Table Look-Up Capability

Please send more detailed information on The Data Analyzer

Name _____

Company _____ Position _____

Address _____ City _____ State _____ Zip _____

OR, call Ray Novak
(201) 391-9800

PROGRAM PRODUCTS

Program Products Incorporated
55 Chestnut Ridge Road
Montvale, New Jersey 07645
201/391-9800
TWX - 710-990-5253

Please stop at our booth #2526 at Info 79.

Multiple Systems Users:

Super-MSI prevents Integrity Problems from creeping into your Shared Data

SUPER-MSI™
The Multiple Systems Integrity Facility™

provides these major benefits:

- Super-MSI protects your shared DASD data by ensuring cross-system integrity. This applies to all datasets—including, of course, VSAM.
- Super-MSI eliminates RESERVE lockouts, thereby improving performance, enhancing real-time (eg., TSO) response and reducing costly, unscheduled IPLs.
- Super-MSI provides pertinent information to your operators and TSO users regarding dataset conflicts as they occur—thus enabling them to be expediently resolved.
- Super-MSI also improves throughput by permitting work to be balanced more evenly across your systems—this is possible since integrity is now guaranteed.
- Because your data is very critical, Super-MSI has been designed with reliability as a foremost concern. For example, Super-MSI will provide continuous, airtight, protection even if several of its own communication tables suffer hardware failure.

Also consider MSM™ the Multiple Systems Manager™:

- MSM automatically manages the inter-system usage of your TAPE and mountable MSM devices. MSM allows your systems to be operated in a very "natural" manner—all devices are normally ONLINE to all systems.
- MSM increases operator productivity by relieving them of the tedious "housekeeping" chore of monitoring and initiating which systems use which devices.
- MSM increases system productivity by allowing devices to be allocated—as needed—by any system in your complex. This is now done at computer speed rather than human dictated speed.
- By managing inter-system devices more efficiently, MSM very actually allows you to reduce the number of TAPE and MOUNTABLE MSM units your complex—or its data processing requirements.
- MSM prevents different jobs in different systems from simultaneously trying to use the same TAPE device. This more easily job re-runs and, perhaps more importantly, enhances the integrity of your tape data.
- MSM allows an installation to hierarchically organize devices into "preference groups". MSM insures that devices of higher preference are used before devices of lower preference. If desired, different systems can have different preference groupings. The flexibility of preference grouping allows a number of interesting options to be considered, including: ● Devices dedicated over a particular system to be used by jobs in that system in preference to devices located further away. ● Use of non-shared devices in preference to SHARED devices.
- Free "SOFTSWAP" licenses. In a mixed MVS system, without MSM, a DISK TAPE SWAP holds up all allocations from those not requiring TAPE devices until the SWAP completes. This can be up the system for several minutes. The new MSM "SOFTSWAP" capability now allows non-tape related allocations to proceed while a TAPE SWAP is in progress. This applies to all systems—even the one to which the SWAP is occurring. "SOFTSWAP" will improve overall system efficiency—it will be especially welcomed by TSO users.
- MSM is now available for MVS (MVS/SE), SVS, VS1, MVT and MFT (just as Super-MSI is).

MSM and Super-MSI are separate products, either can be used without the other. However, for the large number of installations using both, Super-MSI and MSM may (optionally) be integrated into a single functional task (address space, region, or partition). This will reduce total overhead (CPU, I/O and memory) by approximately half, and simplify operations (since only one entity, rather than two needs to be considered). Individually, or together, the products use only an insignificant amount of overhead.

Over 300 SHARED DASD and SHARED TAPE installations are already using these products to protect their data and improve the efficiency of their systems. Super-MSI and MSM have logged an aggregate of several million hours of execution time in production systems like your own.

We invite you to try either or both of these products at your own installation. This trial carries no charge and is without obligation. Convince yourself.

To arrange a free trial, or to discuss any questions or concerns you may have, simply give us a call toll-free at 800-543-7863 ext. 303 (except from Ohio where you should call collect at 813-774-3877). Or write: Software Department-Allen Services Corporation-212 West Natoma Road Vandalia, Ohio 45377

Your data is your most valuable asset
—Protect it with SUPER-MSI and MSM

ALLEN SERVICES CORPORATION

HP 1000 Gains Pascal

PALO ALTO, Calif. — Hewlett-Packard Co., has released a version of Pascal for the HP 1000 series of minicomputers.

The Pascal/1000 compiler runs only in the multiuser environment on HP's RTE-IVB operating system and only on the HP 1000. Instruction sets are compatible across all HP 1000 models, so Pascal/1000 will execute on any HP 1000, the vendor said.

The firm recommended, however, a minimum of 284K bytes of main memory for compilation. HP claimed its version of Pascal adheres to the original version of the language designed by Nicklaus Wirth. In addition, HP is working with the American National Standards Institute (Ansi) to make sure HP's Pascal adheres to Ansi Pascal standards, now under development.

Pascal/1000 is the only version of Pascal that HP offers. Although it will execute on any HP 1000, the language may not be for everyone. A spokesman said the Pascal compiler is a large amount of code similar to HP's Basic compiler or Control Data Corp.'s Pascal compiler.

Basic, Fortran IV and SPL, an HP assembly language, are also available on the RTE-IVB operating system, according to HP.

Pascal/1000 will link with other HP proprietary software such as Image/1000, Graphics/1000 and Datacap/1000, HP said.

Pascal/1000 costs $4,000 with deliveries scheduled for April, the vendor said from 150 Page Mill Road, Palo Alto, Calif. 94394.

Purchase Orders Tracked For Users of CS, Eclipses

GLENDALE, Ariz. — Software that generates and tracks purchase orders for Data General Corp. Commercial Systems (CS) and DG commercial Eclipse systems is available from Advanced Systems Consultants, Inc.

The purchasing system is implemented in interactive Cobol (for CS systems) and can be translated to AOS Cobol for the Eclipse systems, the vendor said.

The software was designed for users running CS Cobol developed by Mini-Computer Business Applications, Inc. (MCBA). The software interfaces with MCBA's Order Entry/Invoicing and Accounts Payable packages.

The purchasing system also conforms to MCBA's documentation and coding standards and can be used for stand-alone execution.

Software Features

Features of the purchasing system include maintenance and printing of purchase orders; provisions for drop shipments; multiple vendor addresses; multiple branch locations; tracking of inventory and noninventory items; retention of back-ordered items; open purchase order reports by vendor and item number; item receipt verification; and expediting reports.

The package costs $3,000; multiple CPU discounts are available.

A demonstration tape costs $25, the vendor said from Suite 5, 6802 N. 47 Ave., Glendale, Ariz. 85301.

We led the way with disc storage systems for DEC and other minicomputers.

Seven years later, we're still out front.

DIVA still offers the best alternative in disc storage systems for the majority of minicomputers manufactured by DEC, Data General and Interdata — all at less cost, greater convenience, and better performance. For example:

Convenience: DIVA systems respond to host operating support software as though they were original. You get maximum valid data transfer with minimum demands on the host processor. Moreover, DIVA offers unparalleled ease and flexibility in accommodating a variety of drive configurations.

Performance: DIVA systems are superbly engineered to give you up to 30% faster data transfer (1209 Kbyte/sec); with the ultimate ability to deliver error free data from 8 drive units that can provide up to 2.4 billion bytes of storage. Systems are engineered to be rock-steady in operation and easy to maintain.

Price: DIVA systems, while providing overall superior performance, are painstakingly designed for cost-effectiveness which routinely translates into system savings of 25% to 40% over original manufacturer systems.

Service: DIVA systems are supported nationally for service and parts by one of the most reputable third-party service groups in the country — Engineering Services of Control Data Corporation. From day of installation out to five years beyond availability of system.

DIVA

987 Industrial Way West
Eatontown, NJ 07724
(201) 544-9000

'Lamp' Lights Utility Reporting

AUSTIN, Texas — The Load Analysis and Market Planning (Lamp) software for electric utilities running IBM 30, 4300, 370 or 360 series mainframes is available from Intel Corp.'s Commercial Systems Division.

Lamp uses Intel's data base management technology to meet the requirements of the Public Utilities Regulatory Policies Act, the vendor said. Section 133 of that act requires power utilities to report the kilowatt hours of electricity used on an hour-by-hour basis and perform various kinds of analyses on power consumption.

Lamp allows analysts to combine load market data in a common data base to perform load analysis and answer market-related questions, according to Intel.

Lamp features include an English-like query language; the ability to operate in either interactive or batch mode; the production of seven standard reports; a Cobol interface; a report writer; and a teleprocessing monitor interface.

Lamp runs under OS/VS, DOS/VS and DOS/VSE with CICS. It requires a minimum of 200K bytes of memory and costs $102,000, Intel said from 12675 Research Blvd., P.O. Box 9968, Austin, Texas, 78766.

Two Seminars Set On Queuing Theory

SAN FRANCISCO — A three-day seminar on queueing theory will be presented March 5-7 here by Technology Transfer Institute.

Designed to give attendees a sufficient knowledge of queueing theory to address modern engineering problems, the course will be presented by Dr. Leonard Kleinrock, professor of computer science at the University of California at Los Angeles.

A similar course will be offered March 5-7 in Boston by Dr. George Fishman, professor of operations research and systems analysis at the University of North Carolina. The Boston seminar will also feature a discussion of the analysis of the output obtained from simulation, TTI said. Each course costs $675 and includes documentation and lunches, TTI said from P.O. Box 49765, Los Angeles, Calif. 90049.

Credit Snags Send Batch Clothier On-Line

Special to CW

MEXICO CITY, Mexico — Inaccurate accounting data and lags in billing, payment updating and fielding customer credit account inquiries led a retail clothing chain here to scrap its batch credit verification method in favor of an on-line system.

Before implementing a credit-accounting data base and an on-line credit verification system, Suburbia in Mexico City collected all credit information manually and transferred it to punched cards. The cards were then submitted on a monthly basis for batch processing on a 385K-byte IBM 370/135 mainframe at Suburbia's parent company's DP arm, Servicios de Informatica.

However, Suburbia's physical growth over the years into a chain of eight stores and a concurrent increase in credit sales began to tax the capabilities of the batch system.

With credit sales accounting for an average 4,000 transactions daily — and reaching between 10,000 and 20,000 daily during seasonal and holiday peak shopping periods — "there were problems with the accuracy of the accounting data and an elaborate and time-consuming error-correction cycle associated with the keypunch method," according to Credit Manager Santos Zuniga.

Further, Zuniga said, "we had a potentially serious cash-flow problem because we didn't have as much control in identifying overdue accounts as we would have liked."

Best Solution

After examining several alternatives, management agreed that the best solution to the problem would be a data base and data communications system for credit management that could be expanded to include other applications at a later date.

Suburbia chose Cullinane Corp.'s IDMS data base management system and installed it on the 370/135 under DOS/VS. The software was interfaced with IBM's Customer Information Control System teleprocessing monitor to support a network of IBM 3270 remote on-line terminals installed at each Suburbia store for use by authorized credit department personnel and at a central credit authorization pool at corporate offices. The interactive CRT terminals communicate with the central computer at Servicios de Informatica via private telephone lines.

The data base file structure, Zuniga said, integrates all credit information into one centralized system and interrelates data logically depending upon the particular function to be performed — such as credit authorization, invoicing, sales audits, tracking and identifying delinquent accounts and crediting refunds.

The use of a central integrated data base has eliminated the problem of data being inconsistent from one file to another. In addition, inaccurate billing no longer occurs because customer payments and refunds are credited "immediately," he noted.

Under the present system, one transaction automatically performs several functions. For example, a cashier calls the central pool and gives the customer's number or name and the amount of purchase. An operator calls up the customer's file on the CRT screen and determines credit limits.

At the same time, the customer billing file and other related files are updated automatically, Zuniga explained.

This daily balancing of sales recorded in the cash registers against credit sales recorded in the computer system has "significantly" improved accounting control, he added.

In addition to the on-line credit management application, Suburbia uses the data base as an information resource for periodic batch reports, produced through Cullinane's IDMS/Culprit report generator software.

Before implementing the IDMS system, "there was virtually no data base experience in Mexico," remarked Jose A. Galaz, general manager of Servicios de Informatica. "Developing the credit management system was, therefore, a learning experience for us," he added, admitting "we had some design problems, but solved them by working closely with Suburbia management to define its needs."

Shipping-Billing Gap Closed

By Dick Packman
Special to CW

ELK GROVE, Ill. — What did a computer do for us? Within six weeks after installation of our system, our company's two-week lapse between shipment and invoicing was replaced by next-day billing. I don't have to elaborate on the dramatic impact that has on cash flow.

Now, only six months later, our DP operation has enabled us, a relatively small supplier in the office products field, to compete in the marketplace with large, national companies.

Problems with billing at our firm, Tempo Office Products, started me looking at computers. But having no DP staff and no knowledge of computers, I had "buyer's phobia" — I wasn't sure if and how computers would work for us.

After looking at a variety of systems, I chose Systems Management, Inc. (SMI) of Rosemont, Ill. I was familiar with SMI and felt they had the computer sophistication and know-how I lacked.

Because of my skepticism about computer capability, I made arrangements to rent the hardware — a 10M-byte Microdata Corp. Reality system with a 75 char./sec printer and two CRTs — from a third party. But I bought a portion of SMI's Business Control Programs — accounts receivable inventory and billing.

Despite the relatively short time we have had the system, I have been thoroughly converted from a computer skeptic to a believer. We now have a system on order consisting of a 50M-byte Microdata Reality with a 600 line/min printer and five CRTs.

We have developed our own marketing analysis program, which we are having copyrighted. With this program, we expect to double our sales this year. In addition, we intend to add SMI's Sales Analysis module to our system.

None of this would have been possible without the assistance of our vendor. In fact, with SMI's support and the high-level inquiry and retrieval language — Microdata's English — on our system, I don't foresee any need to hire DP personnel.

If there is any advice I can give to a company looking at computer systems for the first time, it is this: Carefully determine your needs and then spend your money with a company that sells both the hardware and software to fill those needs.

And make sure that the information you put into the system is accurate. Take the time necessary to do this, as it will save you a lot of hours and headaches in the long run.

Although all of us at Tempo Office Products are still working the same number of hours, we are working smarter — more profitably.

Packman is president of Tempo Office Products in suburban Chicago.

Novas Using Extended Basic Get Indexed Access Method

NEW YORK — An indexed access method for Data General Corp. Nova users running Extended Basic is available from Stratmar Business Solutions Corp., a division of Stratmar Systems, Inc.

Called KAM, the package allows programs written in Extended Basic to randomly add and retrieve records based on a user-defined alphanumeric record key.

It also retrieves records in a logical record key sequence, protects files and uses partial keys and multiple record keys, the vendor said.

The utility programs are selectable by a utility menu. Access routines for adding, changing, deleting and retrieving records are incorporated into a single subroutine that is included with the user's application program.

The access subroutines require 3.5K bytes of memory in an application partition, and each subroutine can simultaneously handle up to three KAM files.

The package costs $765, the vendor said from 385 Madison Ave., New York, N.Y. 10017.

INTERNATIONAL CONFERENCE ON COMPUTER CAPACITY MANAGEMENT
April 8-10 1980

IMPROVE YOUR COMPUTER CAPACITY MANAGEMENT IN JUST THREE DAYS.

Attend the Second Annual International Conference for Computer Capacity Management to find out how you can develop and improve your organization's capacity management function.

You'll hear how people are applying a broad range of capacity management techniques and the results they are achieving. The conference will focus on specific problems and opportunities that are relevant to anyone concerned with effectively managing their computer resources.

Held at the Fairmont Hotel in San Francisco, April 8-10, sessions will include:

- Capacity Management in Practice
- Workload Forecasting and Characterization
- Equipment Characterization
- Costing and Billing
- Service Level Management
- Performance Prediction
- Computer Vendor Instrumentation Advances
- Performance Measures
- Performance Reporting

Special Events will include:

- Capacity Management in Europe
- Spouse Program
- Common Interest Sessions
- Vendor Technical Program

EARLY REGISTRATION FEE ONLY $255
REGISTRATION AT THE DOOR $295

Special Capacity Management Tutorial Program — April 7 ($65 additional)

Due to limited accommodations, make your registration today. For more information, call or write.

INSTITUTE FOR SOFTWARE ENGINEERING
P. O. Box 637 • Palo Alto, CA 94302 • (415) 493-0300

_____ Register me for the 1980 ICCCM Conference April 8-10, in San Francisco for $255, and
_____ The Tutorial Session on April 7 for $65
_____ Please send me more information.

I cannot attend the conference. Please send the proceedings.
_____ 1980 ICCCM Proceedings, $85
_____ 1979 ICCCM Proceedings, $85
_____ Bill our organization. _____ Payment Enclosed

NAME_____ TITLE_____
ORGANIZATION_____
ADDRESS_____
CITY_____ STATE_____ ZIP_____
PHONE (_____)_____

1980s: The Information Decade

"Technologies of immense social and industrial potential will transform social and economic patterns in the coming decade."
James Martin

"The corporations which will excel in the 1980s will be those that manage information as a major resource."
John Diebold

Ten years of achievement ..... looking forward to ten years of challenge.

Information Technology in the Eighties

We are witnessing an unparalleled change in communications and information processing. Computing equipment and telecommunications costs have plummeted for everything from micro to maxi computers, from "dumb" terminals to "intelligent" terminals. At the same time, software systems are more sophisticated and productive. The result? A proliferation of distributed intelligence that can be tailored to an organization's needs.

Only by implementing such systems can organizations adapt themselves to meet the needs of the 80s. The proper use of information systems technology will be essential for attaining high productivity and for meeting the many other challenges the 80s will bring.

A Conference for the Eighties

Help prepare your organization for the 1980s by attending DELTAK's 1980 International Data Processing Training Conference. This conference is designed to provide organizations with the expertise to put information systems technology to work.

DELTAK's conference will have something for everyone who must deal with information systems. Top-level executives will receive a timely analysis of business and technoirgical trends. Instructors, training coordinators, and training managers will hear presentations on the latest products and techniques in Human Resources Development. Data processing managers and technical staff will learn about the skills needed to master the proliferating technology of the coming decade.

Main Sessions Feature Diebold and Martin

Main session speakers will present topics of broad technical and managerial concern to the entire conference group. This year's conference will feature James Martin and John Diebold, internationally recognized authorities on the social and organizational implications of technological change. Mr. Martin will discuss rapidly evolving telecommunications and computing technologies. He will focus on the social and economic changes caused by these technoiogies and their effect on business and industry. Mr. Diebold will discuss strategic issues surrounding Information Resource Management, an approach designed to help organizations manage the information explosion of the 1980s.

Kevin O'Sullivan, executive director of the American Society for Training and Development, will give his multimedia presentation "The Great American Teaching Machine," an entertaining analysis of television's effect on the nation's viewing audience and its consequences for trainers everywhere. Other main sessions will feature selected DELTAK executives reporting on DELTAK's newest products and services in the data processing and management development disciplines.

Concurrent Sessions Focus on Specific Needs and Interests

More than a score of concurrent sessions will be presented, each one serving in an a timely topic for executives, training professionals, or data processing specialists. Frances Berger, Rob Ware, John Toellner, William Onohan, and Peter Pipe are just a few of the many outstanding concurrent session speakers. Among the sessions offered will be presentations on Computer-Assisted Instruction, Personnel Trends in Data Processing, the Dynamics of Management Training, and Planning for a Conversion.

Registration

The fee of $175 will cover all sessions for the two days, plus receptions, breakfasts, and lunches. To register, call or write to Sharon Trube, DELTAK, Inc., 1220 Kensington Road, Oak Brook, IL. 60521, (312) 990-0700.

DELTAK: Ten Years of Achievement

This conference marks the beginning of DELTAK's second decade. During the first ten years, more than 3,000 organizations worldwide increased personnel productivity with DELTAK's multimedia training courses, a record that uniquely qualifies DELTAK to meet the challenges of the 1980s. DELTAK — the productivity company, helping you to prepare for tomorrow.

DELTAK
The Productivity Company

Pitfalls for the Unsuspecting

Flood of Electronic Mail Offerings Seen

By Brad Schultz
CW Staff

WASHINGTON, D.C. — The decade's earliest electronic mail offerings may come fast and furiously — with serious pitfalls for the unsuspecting user, according to Yankee Group's president, Howard Anderson.

"Technology is coming almost too quickly for users to assimilate," Anderson told a session of the recent Communication Networks '80 conference here. Cost-justifying electronic mail is not as simple as it used to be; the prudent user may need a full two years to get a system up and running.

Electronic mail gives the user "nonsimultaneous time to solve nonsimultaneous problems," Anderson observed. That means the user can store "problems" as they come through the network in the form of electronic mail and then address those problems on a priority basis when convenient. Thus, the main benefit of electronic mail is saved time — otherwise known as enhanced productivity.

At present, the typical user must determine that electronic mail will boost corporate productivity by at least 4% over the long run to justify its implementation, Anderson said. In many large organizations, he added, "mass sign-off approval" for an implementation proposal may require evidence that a 20% productivity hike will result.

Market Dominance

According to the management consultant, electronic mail will replace telephones as a primary means of commercial communications, which is why AT&T, the world's largest carrier of commercial telephone calls, is working towards dominance in the electronic mail arena. Accustomed to doubling its profits every five years, he continued, Bell must diversify away from the phone business to maintain that lucrative pace.

Anderson said that Bell's investment in intrabuilding wiring may give it an inherent and seldom-noticed advantage over aspiring competitors. Carriers and terminal vendors that control the user's building and local networks will determine how that user can best implement electronic mail and other telecommunications functions. As Anderson put it, "Bell has you by the local loops."

Drawing a contrast between AT&T's service proposals and the projected offering

'Anderson noted that satellites work well for the first 46,000 miles of transmission. But there's a real problem in delivering messages over the last 46 feet.'

from Satellite Business Systems (SBS), Anderson noted that satellites work well for the first 46,000 miles of transmission. But there's a real problem in delivering messages over the last 46 feet.

With its first satellite launching now scheduled for October, SBS has focused on

(Continued on Page 48)

Message Switch Handles 2,000 Terminals

By Brad Schultz
CW Staff

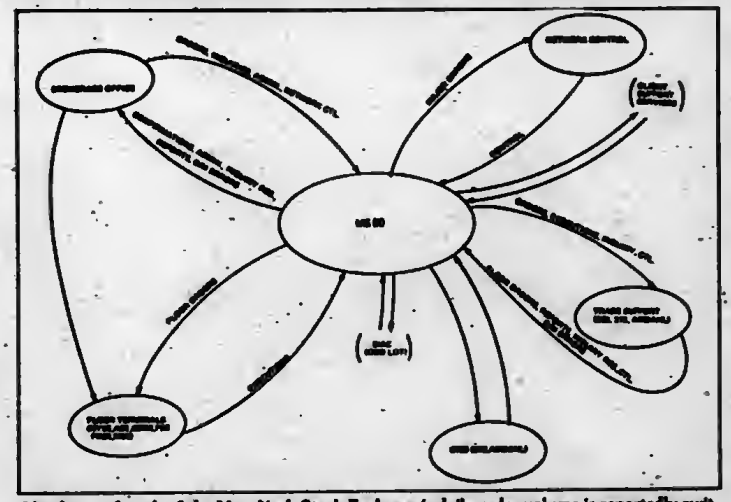
NEW YORK — Supporting IBM's 2780/3270 and other protocols, a message switch based on Digital Equipment Corp.'s PDP-11 minicomputer family that handles up to 250 asynchronous and 64 synchronous lines and as many as 2,000 terminals is available from Conversational Systems Corp. (CSC).

Already serving two large users, the MS60 message switch runs under DEC's standard RSX-11M operating system to deliver services that range from purely interactive to more accountable store-and-forward, a spokesman maintained.

In describing the MS60's features, CSC emphasized an aspect significant to any switch: the scope of equipment, protocols and services the machine can handle.

Besides contemporary IBM terminals, the switch supports certain Bell protocols, TWX, direct distance dialing, Western Union Telegraph Co.'s domestic Telex and the international Telex offerings of Western Union International, Inc., ITT and RCA Global Communications, Inc.

(Continued on Page 44)



Nearly one-fourth of the New York Stock Exchange's daily order volume is reportedly switched by the MS60 configuration shown above that links a number of IBM and Amdahl Corp. mainframes.

CLIP AND RETURN FOR FAST RESPONSE

acoustic couplers

for a variety of terminals
☐ Series 150A
300 baud, 31 models
Available for a variety of terminals — Teletype, Digital Equipment Texas Instruments . . .
$147

with tape interface
☐ 302C2-13
Data rate to 300 baud
Magnetic tape interface
Operates with audio recorder
Provides block and record markers
$425

with universal interface
☐ Series 302A,B
300 baud, 19 models
Simultaneous EIA/20ma interfaces
Hardwire options
Optional interfaces
$245

OMDATA

Switch Handles 2,000 Terminals

(Continued from Page 43)

"Designed and developed" for the PDP-11 family, the MS80 is actually a series of switches based on DEC's PDP-11/44 through PDP-11/70 models, the spokesman noted.

The MS80 will function with any DEC disk drive supported by RSX-11M, the spokesman added. That would include DEC's RK05, RK06 and RK07 drives and the RM02, RM03, RM04, RM05 and RM06 drives.

Other DEC peripherals can be accommodated, the source continued, because all I/O is done through the RSX-11M structure.

According to CSC, all line services can support speeds as fast as 9,600 bit/sec with the appropriate communications interface. The MS80 fits DEC's DJ11, DH11 and DZ11 asynchronous multiplexers and the mini maker's DV11 synchronous multiplexer and DN11 autodialer interface.

Optional 56K bit/sec synchronous interfaces and bit-oriented interfaces are reportedly available.

Security Features

In the area of accountability and security, the MS80 is said to feature user-definable subnetworks and user-definable security and routing restrictions. From this standpoint, the user can define 31 distinct classes of stations and 31 classes of messages.

Other features enable the user to monitor the flow of messages in order to log who receives them and when they were received. And, according to CSC, recovery from any network "crash" can be achieved in less than five minutes.

In the area of network control, the MS80 reportedly features operator control emanating from any eligible network station, on-line modification of poll/select codes and polling patterns and the ability to change communications ports without stopping the system.

Message Volume

The switch can process up to 10 messages (or 2,400 characters) per second. With the RP04 or larger disk drives, up to 250,000 messages can be handled daily, CSC said.

The MS80 has a special interface to user programs written in Cobol or Fortran and can be purchased with 300-, 600- or 1,000 line/min printers that function as on-line message-dumping devices.

The switch starts at $75,000, depending on the user's traffic volume and network configuration. CSC is at 132 W. 31 St., New York, N.Y. 10001.

"Required reading for everyone in data processing"
Computing Reviews

DATA PROCESSING

WRITTEN COMMUNICATION FOR DATA PROCESSING
Randi Sigmund Smith
224 pp. 6 X 9. $16.95

Managers, analysts, programmers — you know the value of clear, concise memo writing to the overall success of data processing projects. It facilitates the coordination of project members' efforts and keeps systems running smoothly and efficiently.

Here's a comprehensive handbook that helps you sharpen your writing skills. Randi Smith — developer and teacher of courses in effective communication for major corporations and government agencies — provides easy-to-follow guidelines for writing memos that relate specifically to communication within a data processing environment.

Her handy "Six Keys to Success" checklist will help you evaluate your current writing skill. Then her detailed writing techniques will demonstrate how to define your goals and desired results in a crisp style that guarantees quick comprehension of your message.

Randi Smith knows you can't afford to have your work flow interrupted by snags in communication. Let her guidebook to successful writing save you valuable time and make your demanding job that much easier.

VAN NOSTRAND REINHOLD, Mail Order Service
7625 Empire Drive, Florence, KY 41042

Please send me Written Communication for Data Processing for 15 days free trial. After 15 days I will send $15.95 plus postage and handling, or return the book and owe nothing. (Payment must accompany orders to P.O. box addresses.)

SAVE MONEY! Check here if enclosing payment with order and we pay shipping and handling. Same return-refund guarantee. Local sales tax must be included.

Name _____ Address _____
City _____ State _____ Zip _____

Offer good in U.S.A. only and subject to credit department approval. Price subject to change.
277593 A7711

DATA CENTER

WANG

"The Full Service Data Center"

15 Years of Reliability and Service

EXCELLENT TURNAROUND AND PRICES UTILIZING IBM's LARGEST MAINFRAME, 3033, IN ADDITION TO WANG'S LATEST MACHINES SPECIALIZING IN INTERACTIVE DEVELOPMENT AT VERY COST-EFFECTIVE RATES.

Full Local and T.P. Support
Extensive Library and Language Processors
Full Set of Utilities

FULL-TIME CUSTOMER SUPPORT
ON-SITE CUSTOMER WORK OFFICES
BACK-UP FOR DISASTER DOWNTIME

OPEN 24 HOURS A DAY
SEVEN DAYS A WEEK

20 South Ave
Burlington
272-8550

Three Carriers Agree On Packet Net Protocol

VIENNA, Va. — Three major data communications carriers in the U.S., Canada and Japan have reached agreement on a common communications protocol for supporting binary synchronous terminals over their public packet networks.

The carriers are GTE Telenet Communications Corp.; TransCanada Telephone System, which runs Canada's Datapac network; and Kokusai Denshin Denwa Co., Ltd. (KDD), Japan's overseas telecommunications carrier.

The agreement will enable the carriers to introduce a compatible international data transmission service for this widely used class of terminals, according to a spokesman for GTE Telenet. Typical DP applications that run on binary synchronous terminals include remote batch and remote job entry, source data automation and word processing, the spokesman explained.

While Telenet and TransCanada's packet are already interconnected on an international basis, KDD is expected to offer packet-switching services to the U.S. and Canada through facilities of this country's international record carriers and Canada's Teleglobe.

The GTE Telenet spokesman said that the three carriers will be working with other common carriers and with DP equipment vendors to make compatible services available to data communications users on a worldwide basis.

Technical details of the binary synchronous interface for packet networks may be obtained from Sheldon L. Fox, manager of network interface design, GTE Telenet, 8330 Old Courthouse Road, Vienna, Va. 22180.

In other news related to Telenet, the GTE subsidiary announced it has certified DTSS, Inc.'s X.25 software. DTSS, a Hanover, N.H.-based service bureau, announced a year ago it would support X.25, the international standard protocol for packet-switching. The Tslenet packet is reportedly used by most DTSS customers.

Data Briefs

Price Cut $10 On CAT Modem

TARZANA, Calif. — Novation, Inc.'s CAT acoustic modem now costs $189, a $10 reduction.

The bit/sec answer/originate modem is reportedly Bell-compatible, has an RS-232C interface and weighs 1.5 lbs.

Novation's address is 18664 Oxnard St., Tarzana, Calif. 91356.

Videotext Book Gives First-Hand Reports

WHITE PLAINS, N.Y. — *Videotext: The Coming Revolution in Home/Office Information Retrieval* reportedly contains first-hand reports on experiments with remote data base services in England and the U.S.

Costing $24.95, the book is published by Knowledge Industry Publications, Inc., White Plains, N.Y. 10604.

Teleray Terminals Come In RS-310C Rack-Mount

MINNEAPOLIS — All smart terminals from Research, Inc.'s Teleray Division are now offered in RS-310C rack-mount configurations.

Detached and panel-mounted keyboard versions cost $280 and $322, respectively.

Teleray's address is Box 24064, Minneapolis, Minn. 55424.

Report Details Rate Experiment

SPRINGFIELD, Va. — A procedure for designing an experiment to estimate time and rate parameters in a digital communication system is available in a report by the U.S. Commerce Department's National Telecommunications and Information Administration (NTIA).

Costing $4.50, the document provides statistical methods for estimating parameters in compliance with proposed federal standard 1033.

According to NTIA, transmission of digital data can be characterized by such time intervals as delay times, disengagement times, period between outages, outage durations and bit, block and message transfer times.

The NTIA Report 79-21 may be obtained from the agency at 5285 Port Royal Road, Springfield, Va. 22161. Accession number is PB 297-977/AS.

HEWLETT-PACKARD
HP 3000 SYSTEM
SERIES 2 MOD 8
CALL TODAY FOR QUOTE
NEWMAN COMPUTER EXCHANGE
(313) 994-3200

DATA GENERAL "LOOK ALIKES"

CMC is proud to present a series of terminals suitable for use on Data General Micronova and Nova computers. The products listed have been tested and the firmware revised to emulate the equivalent DG products listed.

Hazeltine H1500/DG CRT emulating the DG 6052/6053 series of CRT terminals. $1095
ADDS Regent 25/DG emulating the DG 6052/6053 ..... $1095
Texas Instruments 810/DG (150 CPS) emulating the DG LP2 printer ...
Basic model $1695
Option package $1955
Centronics 703-1/DG (180 CPS) emulating the DG LP2 printer $2380
Centronics 6300/6600/DG (300/600 LPM) emulating the DG line printers .. from $4385

Quantity discounts available
Write for catalog on all our products

CMC Marketing
10611 Harwin Drive #406
Houston Tx 77036
713/995-4960 • TELEX 762072

Higher Frequency Band Open by 1990s?

Nasa Working to Increase Satellite Capacity

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — A massive research and development program aimed at substantially expanding U.S. satellite communications capacity has been launched by the National Aeronautics and Space Administration (Nasa).

The program is focused on opening the 20 GHz to 30 GHz frequency band to commercial users by the early 1990s, when growing traffic is expected to saturate the satellite systems operating at lower frequencies.

During fiscal years 1980 and 1981, Nasa plans to spend nearly $30 million on producing a satellite capable of operating at 20 GHz to 30 GHz, according to John McElroy, director of the agency's Communications Division.

Satellite 'Rationing'

McElroy and another panelist at the recent Communications Networks '80 conference here — RCA American Communications, Inc. Vice-President Harold Rice — indicated that satellite facilities may become saturated long before the Nasa system is offered.

Rice reported that his company has been "out of circuits" since September 1978. Western Union Telegraph Co., he added, recently began rationing its Westar satellite capacity.

RCA has enough orders currently on hand to fully utilize the capacity of two additional satellites, Rice stated. This backlog exceeds commercial demand projected for the year 2000 by recent ITT and Nasa studies.

Transmission Speeds

Another panelist, Dr. Eugene Cacciamani Jr., vice-president of American Satellite Corp., predicted that the lower limit of satellite data transmission speeds will soon be 9,600 bit/sec.

Later in this decade, small, inexpensive earth stations supporting high-powered satellites will provide a variety of information and image-processing services direct to the home, Cacciamani added.

Dr. Robert S. Cooper, engineering vice-president of Satellite Business Systems, told the session his company will begin work on its second-generation facility this year. Scheduled for a 1986 launching, the system Cooper described will feature an improved transponder designed specifically to send the receive digital signals.

Cooper said the spacecraft will also employ cross-polarization to increase frequency utilization and dynamic, on-board switching capability.

Another carrier's vice-president, Billy Oliver of AT&T Long Lines Division, estimated that Bell will have 20,000 satellite voice circuits running by the end of this year, compared with 14,000 circuits at present.

Recent "quality of service" studies show that the satellite voice circuits — when equipped with a newly developed echo canceler — transmit phone conversations with the same quality terrestrial circuits provide, Oliver said.

The echo canceler is reportedly about one-fourth the size of a postage stamp.

Satellite Business Systems is reducing the number of bits required to transmit voice messages digitally, Cooper noted. Next January the firm will use a 32K bit/sec encoding scheme for voice messages passed through its first generation spacecraft, slated for launching this fall.

Commercial digital voice transmission systems presently require a 64K bit/sec bandwidth, Cooper pointed out. By 1986, he maintained, use of digital speech interpolation is likely to produce a 16K bit/sec voice-encoding system.

Bandwidth may eventually be reduced to 9,000- or 10K bit/sec, the carrier executive added.

AT&T plans to launch its second-generation satellite, a follow-on to the present Comstar facility, in the spring of 1983.

"Informatics made a lot of promises when they hired me. All of them were kept."

Tim Mahaffey
Programmer/Analyst
Informatics Inc.

"I [illegible] that other job offers when I came to Los Angeles. Who needed [illegible] Informatics people [illegible] the biggest impression on me. They were really open. When I got through talking to them, I felt that I was still an individual, not a body they were just going to polymorphic to some convenient slot.

"They made promises — about helping me develop more greater capabilities, about the training that would give me a broader data processing background, about paid overtime and so on. It almost sounded too good to be true. But they've kept their word.

"Even when I'm out in the field working with an Informatics client, there's a line open between me and the home office because my manager checks with me regularly. I do feel as though I'm still important. And all of us from my Informatics home office frequently discuss what's happening in data processing in general and to each of us in particular. There's pretty good contact all around.

"Informatics has really delivered on their promises. You can bet I deliver for them."

Information Professional Services Operation provides consultant services to major corporations around the U.S. We've built our reputation on our staff's ability to successfully complete difficult DP projects for our clients. We're looking for good people to join Tim Mahaffey as programmer/analyst.

In this position, you'll be helping to develop and implement effective solutions to our customers' business and professional needs, and you'll be participating first hand in new developments in database and on-line techniques.

The people we're seeking have creative minds that can come up with a workable solution to an immediate problem and possess the energy to implement that solution. A background of at least two years' experience on large IBM systems using COBOL is necessary (experience with IMS, Mark IV/e or CICS is also a plus).

Informatics offers incredible variety, the opportunity to work with virtually every type of data processing system, a real chance to make as great a contribution as you want — as well as an unlimited growth factor. And, given our Fortune 500 clientele, there's the level of compensation you might expect — plus paid overtime.

The good life in data processing is waiting for you right now. Just send your resumé to:
Professional Services
Informatics Inc
1 Market Plaza
Spear Street Tower
San Francisco, CA 94105
Or call us at 415/964-9900 and ask for Sonia.

Informatics Inc

We can help each other grow

Professional Services / Informatics Inc / 1 Market Plaza / Spear Street Tower / San Francisco, CA 94105
Offices in San Francisco, Los Angeles, Palo Alto, Seattle, Dallas, Houston.
An equal opportunity employer (m/f)

The Sign of the 80's.

Greater yield has arrived with TI's new *Silent 700 780 Series Electronic Data Terminal Family.**

Clear the road for the most innovative thermal printing data terminals available on the market today. Introducing TI's new state-of-the-art 780 Series of 120 characters-per-second data terminals.

Every model in the four-member family features TI's innovative dual-matrix thermal printhead providing virtually silent 120-cps optimized bi-directional printing, that cuts down on print cycle time and yields four times the printing speed of conventional thermal printing data terminals.

Industries with high output printing demands will find the Model 781 Receive-Only Printer a reliable business partner. The 781 RO features an operator control keypad for referencing the terminal's operating status, a 1000-character receive buffer and 110 to 9600 bits-per-second communications speed.

Commercial applications can get top-quality performance from the desktop Model 783 Keyboard Send-Receive Data Terminal with features like a full ASCII keyboard, self-test diagnostics and programmable answerback memory.

The lightweight 17-pound Model 785 Portable Data Terminal is an ideal traveling companion for remote data access and entry applications. With a built-in 1200-bps acoustic coupler, the 785 can transmit and receive data from anywhere using a standard telephone and electrical outlet.

The Model 787 Portable Communications Data Terminal is designed to improve your communications capabilities. The 787's 1200-bps direct-connect internal modem allows users to plug directly into a standard data jack. With its memory dialing feature, the 787 can dial a stored number and provide audible feedback of the phone line's status. The 787 can also disconnect the phone line with a simple hang-up command, so you can optimize on-line communications and minimize communications costs.

Available user-oriented 780 Series options like international keyboards and protected answerback memory add even more versatility to your business communications.

TI is dedicated to producing quality, innovative products like our new 780 Series Family. And TI's hundreds of thousands of data terminals shipped worldwide are backed by the technology and reliability that comes from over 30 years of experience in the electronics industry.

Supporting TI's data terminals is the technical expertise of our worldwide organization of factory-trained sales and service representatives, and TI-CARE†, our nationwide automated service dispatching and field service management information system. That's why TI has been appointed the official computer and calculator company of the 1980 Olympic Winter Games.

The *80's* can be yours today. For more information on the 780 Series Family, contact the TI sales office nearest you, or write Texas Instruments Incorporated, P.O. Box 1444, M/S 7784, Houston, Texas 77001, or phone (713) 937-2016.

Fifty Years of Innovation

*Trademark of Texas Instruments †Service Mark of Texas Instruments Copyright ©1980, Texas Instruments Incorporated

TEXAS INSTRUMENTS

We put computing within everyone's reach.

Onrush of Electronic Mail Offerings Predicted

(Continued from Page 43)
the broadcast link between the user's rooftop "earth station" — a dish antenna several feet in diameter — and the satellite orbiting about 23,000 miles up in outer space.

But, Anderson claimed, SBS neglected the problem of forwarding the transmission from the roof site to the user's terminals, presumably a few floors below in the building.

However, the joint venture of IBM, Communications Satellite Corp. and Aetna Life & Casualty Co. will probably solve this 11th-hour wrinkle, the Yankee Group president surmised. He expects SBS to make nothing this year, but earn about $15 million in 1981 and post some half a billion dollars in revenues for 1985.

Meanwhile, the user trying to make sense of these developments must also take stock of Xerox Corp.'s Xerox Telecommunications Network (Xten) project, currently under review by the Federal Communications Commission.

Anderson considers Xerox's recent purchase of Kurzweil Computer Products, Inc. a poignant move in the Xten campaign. The latter firm's founder, Raymond Kurzweil, received the Association for Computing Machinery's Grace M. Hopper Award in 1978 for his invention of a computer system that converts text to voice for blind people.

The Kurzweil acquisition shows that Xerox may offer text-to-voice services incorporating telephone circuitry, Anderson said.

In a few years, customer executives may routinely dial up their host computer system and listen to EM correspondence that was initially routed to the host via facsimile or conventional digital transmissions.

Anderson pinpointed what he considers a major gap in Xerox's arsenal for the anticipated carrier war: a facility for manufacturing the controllers users will need to merge data, voice, facsimile and video transmissions as well as to assimilate different types of equipment, interfaces and protocols.

AT&T is already perfecting this sort of controller, he said, for operation on the customer's premises or accessibility through Bell's Advanced Communications Service.

'Anderson predicted that Xerox will buy a minicomputer manufacturer soon and put it to work on a supercontroller project.'

Called Antelope, Bell's "supercontroller" will meet the user's growing need to consolidate technical management of various forms of telecommunications, Anderson said.

Yankee Group expects Antelope to support six emerging Bell services and encompass teleconferencing, voice store and forward, electronic mail, environmental monitoring and control, computer query response, data base management and Cobol.

But before the Antelope debuts (in 1983, according to Yankee Group), more modest designs will be set to graze in the data communications corral. At the conference, for example, American Satellite Corp. introduced an intelligent controller for simultaneous transmission of data, facsimile, voice and video at 56K bit/sec [CW, Feb.4].

What will Xerox do in the meantime to counter AT&T's strategy? Anderson predicted that Xerox will buy a minicomputer manufacturer soon and put it to work on a supercontroller project.

The Decade Ahead

According to Anderson's vision of the decade ahead, global markets, political relationships and individual lifestyles will be reshaped as a voice technology continues to merge with computer technology.

There are important reasons, he said, why Exxon Enterprises — one of the world's largest petroleum companies — presently has, by Yankee Group's count, 14 subsidiaries in the DP industry — some of them committed to development of computer speech recognition.

Citing salesmen as an example of the people who would benefit from integrated voice/data electronic mail, Anderson estimated that every day a typical salesman spends four hours fighting with his home office, three hours doing front office work and two hours working with customers. The home office "fight" and much of the other activities now entail telephone work that electronic mail can eliminate.

Mr. John Toellner,
President,
takes pleasure in announcing that
STATE OF WESTERN AUSTRALIA
has selected
SPECTRUM 1
for
its project development methodology
SPECTRUM INTERNATIONAL INC.
4311 Wilshire Blvd., Suite 312
Los Angeles, California 90010 • (213) 931-1127

ADL.
WE'RE INTO WHAT YOU'RE INTO.
HAZELTINE
DEC
TELEVIDEO
TEXAS INSTRUMENTS
CENTRONICS
DATEC
HEWLETT-PACKARD
COMPUTER ROOMERS
IMPACT DATA
XEROX
TERMINALS
COUPLERS
PRINTERS
CRTS
DELIVERY
MAINTENANCE
PRICE
ADL ENTERPRISES, INC.
Richard Mine Rd, Wharton, NJ 07885, (201) 328-1300
Atlanta (404) 581-0281
Philadelphia (215) 923-8486
P O Box 362, Moraga Ca 94556, (415) 376-8380
WE'RE INTERESTED IN: _____
Name _____ Title _____
Company _____ Phone _____
Address _____
City, State _____ Zip _____

ATMs Give Student Allowances

MONROE, La. — College students here in northern Louisiana are getting their allowances from banking terminals under limitations set by their parents.

"Allowance-by-computer" is featured by the so-called Liberty network linking 36 IBM automated teller machines (ATM) in 26 cities to 18 banks in this largely rural area.

The service was programmed into the data net as a convenience to parents and to spare young people the hassles and expenses of check-cashing, according to Rodney Johnson, senior vice-president of Monroe's Ouachita National Bank.

Local Accounts

College students in the vicinity usually have a hard time cashing out-of-town checks, Johnson explained. So they open local bank accounts where they must pay a service charge and buy checks.

"We noticed that these accounts were responsible for a large number of "NSF items" (bad checks drawn on accounts with insufficient funds), and these were costing the students dearly," the banker pointed out.

For example, "a student would write an 87-cent check at a convenience store and because there wasn't enough money in his account, he'd have to pay a $5 NSF charge," Johnson said. "That's pretty tough interest for the amount of money involved.

Ties With Home

"So we came up with an idea: let's let the student maintain an account in his home bank or let's give him a card and relate it to his parent's bank account."

That's how allowance-by-computer works. Parents who have checking accounts at any of the banks connected to Liberty can authorize their son or daughter to withdraw a certain amount of money each month.

Different Password

The bank then issues the student a personal Liberty card made of plastic and featuring a magnetic stripe with coded indentification data.

The student simply inserts the card into any Liberty ATM and keys in a password number (different from the parents' password) to obtain the proscribed allowance.

The ATMs are driven by an IBM 370/138, which determines whether the transactions are authorized.

NCR 200-5
PORTABLE
KSR TERMINALS
$495.00
— Quiet Thermal Printing
— 10 or 30 CPS Printing
— Full 128 ASCII
— Built-In Acoustic Coupler
— Answer Back Memory
— Serviced Nationally by NCR
Central Penn Multi-List Inc.
800 Poplar Church Road
Camp Hill, Pa.
Phone 717/761-6440

"I LOVE MY COMPUTER" Statues
New shapes from five models: IBM 370, NCR Century, System/3, "plain" (pictured above) ... or the new "I HATE MY COMPUTER" which shows a frustrated CPer strangling his system! Gold-finished, hefty plastic sculptures, perfect paperweight/conversation pieces. $15.00 each, postpaid. Brion Productions, 2848 Southfield Rd., Xenia, Ohio 45385

Unit Tests Phone Line, Modem and Terminal

UPPER SADDLE RIVER, N.J. — A diagnostic teleprocessing tester that connects to terminal and modem equipment via a system of "in-line" adapters has been unveiled by Macwell Data-comm, Inc.

The microprocessor-based, programmable Autotester continually monitors the performance of the telephone line, modem and associated terminal, informing the operator of an error with an alarm and by displaying a two-digit LED error code on its front panel.

Autotest checks to see that the RS-232C/V.24 interface cables are connected and that the modem and terminal are powered up. Further, it monitors the modem-terminal interface to see that it is being controlled correctly, Macwell said.

At the modem level, the unit tests the telephone side of the modem for incoming and outgoing carriers, checking the amplitude and frequency of the carriers to ensure they conform to the telephone line specification.

At the protocol level, Autotest can check the protocol being used by the terminal to see that it is operating correctly. Gross structural specifications or protocol failure will cause an error code to be displayed, according to Macwell.

The tester, which can be connected up to 100 ft from the equipment it is monitoring, costs $3,000, Macwell said from 116 Rt. 17 N., Upper Saddle River, N.J. 07458.

'Optymus' Aids In the Design Of Voice Nets

BETHESDA, Md. — A tool for those designing voice networks has been released jointly by STSC, Inc. and Telco Research Corp.

APL Plus Optymus is software that determines the best allocation of lines to specified service groups and takes into account such factors as call queuing and route advance systems, overflow, FX and Wats groups and interstate and intrastate systems, according to the vendors.

To design a voice network, Optymus uses vertical-horizontal (V-H) coordinates, rate center and tariff data published in Federal Communications Corp. Tariffs 260 and 264.

This data is organized into two very large data bases, STSC said. One contains the V-H coordinates for more than 23,000 North American centers. The other contains the private-line, Wats and Direct Distance Dialing rates for a variety of interstate and intrastate services.

Both data bases are updated periodically in response to published tariff changes, according to STSC and Telco.

Cost for the Optymus service is assessed on a per-use basis, but requires a one-time $750 fee, plus travel expenses, for one day of on-site training. A large network could cost $45 to evaluate and $800 to optimize, although the user can save money by forwarding a request for optimization for overnight — instead of immediate — processing. This would reduce the cost to about $500, STSC said from 7316 Wisconsin Ave., Bethesda, Md. 20014.

Field Sites Get Communications

NEW YORK — Regional or field offices of multidivisional corporations can be equipped with complete communications capabilities for about $13,000, according to Advcom, a division of Intelligent Computer Systems, Inc.

Advcom has introduced a software package called Omicron that enables the user to establish "worldwide" data communications on Texas Instruments, Inc. intelligent terminals — including the TI 771 and the DS990 Model 1 — and on the 774 multistation minicomputer and of the TI 990 models 4, 6, 8, 20 and 30.

An Omicron system would include 4M bytes of storage, a choice of printers and the TI terminals or minicomputers, operating either over asynchronous dial-up lines at 1,200 bit/sec or within a packet-switching network.

Omicron can transmit or receive up to four pages of text coast to coast in 1 min for about 5 cents, according to the vendor. It has three processing capabilities:

- Word Processing. This module contains automatic centering, global search and replace, name replacement, justification, pagination and optional page and/or line numbering.
- Electronic Courier. This addresses and routes electronic mail, allowing up to 21 addresses to be designated at one time.
- Communications procedures. Documents under control of the Electronic Courier are transmitted via this routine to users in remote offices.

The software alone costs $7,500, while a TI Model 990 Model 1 costs $9,450; a 150 char./sec dot matrix TI 810B printer operating at 1,200 bit/sec costs $2,745. An alternative Xerox Corp. 1750 impact printer running at 45 char./sec with communications speeds of 9,600 bit/sec costs $3,850, Advcom said from 540 Madison Ave., New York, N.Y. 10022.

Join the Computer Professionals' Book Club now— and save up to $150 on professional books you thought only libraries could afford!

Now these fundamental reference books can be yours for only a fraction of their cost! Take your choice of these sets—worth as much as $165—for only $14.95 when you join the Club.

These high quality publishers' editions are just a taken of the opportunities the Club provides to help you build your professional library. As a Club member you'll watch your savings add up fast on the latest and best publications in the field—books on programming techniques, computer architecture, languages, distributed systems, data communications, and other vital areas you won't find covered in your local bookstore.

Why YOU should join now!

- BEST BOOKS IN YOUR FIELD—Books are selected from a wide range of publishers by expert editors and consultants to give you continuing access to the latest books in your field.
- BIG SAVINGS—Build your library and save money, too! We guarantee savings of at least 15% off publishers' list prices on every book. Usually 20%, 25%, or even higher!
- BONUS BOOKS—You'll immediately begin to participate in our Bonus Book Plan that saves you 70-80% off the publisher's price of many books.
- CONVENIENCE—Fourteen times a year you'll receive the Club Bulletin FREE, fully describing the Main Selection and alternate selections, together with a dated reply card. If you want the Main Selection, you simply do nothing—it will be shipped automatically. If you want an alternate selection—or no book at all—you simply indicate it on the regular reply card and return it by the date specified. You will have at least 10 days to decide. If, because of late mail delivery of the Bulletin, you should receive a book you do not want, just return it at the Club's expense.

As a Club member, you agree only to the purchase of four books over a two-year period.

1 Data Communications Handbook edited by Harold C. Sabir and Harry G. Kerp. Publisher's Price, $60.95. (Counts as a 3x.) Code #700/579
2 Automatic Data Processing Handbook edited by The Diebold Group. 976 pages. 300 illustrations.
Encyclopedia of Professional Management edited by Lester R. Bittel. Combined Publisher's Price, $60.45. Code #700/204
3 CRC Handbook of Mathematical Sciences edited by William H. Beyer.
Dictionary of Industrial and Technical Terms edited by Daniel Lapedes. 1,800 pages. 2,000 illustrations. Combined Publisher's Price, $60.45. Code #700/320
4 Encyclopedia of Computer Science edited by Anthony Ralston and Chester L. Meek.
Microprocessor Applications Manual by Motorola Semiconductor Products, Inc. 720 pages. Illustrated. Combined Publisher's Price, $60.45. Code #700/312
5 Electronic Engineers' Handbook edited by Donald G. Fink.
Electronic Circuit Manual by John Markus. 600 pages. Combined Publisher's Price, $60.45. Code #700/220

Computer Professionals' Book Club
P.O. Box 582, Hightstown, New Jersey 08520

Please enroll me as a member and send me the set indicated, billing me for only $14.95, plus local tax, postage and handling. If not satisfied, I may return the set within 10 days and my membership will be cancelled. I agree to purchase a minimum of four books during the next two years as indicated under the Club plan described in this ad. Membership in the Club is continuous but cancellable by me any time after the four-book purchase requirement has been fulfilled.

Write Code # of set you want here _____

Orders from outside the U.S. must be prepaid with international money orders in U.S. dollars.

Charge my ☐ VISA ☐ MASTER CHARGE* Exp. Date _____
Credit Card # _____ *MC Bank # _____
Signature _____
Name _____
Address _____
City, State, Zip _____
Corporate Affiliation _____

This order subject to acceptance by McGraw-Hill. All prices subject to change without notice. Offer good only to new members. A postage and handling charge is added to all shipments. F39438

Message Switcher Unveiled

LAKE VILLAGE, Calif. — A microcomputer-based system with text editing and a store-and-forward message-switching capability was introduced by Franklin Systems Corp.

Known as the TC/2 Telecommunicating Electronic Message Processing System, it was designed to communicate with other systems over phone lines via three ports — Telex, Teletypewriter, Direct Distance Dial — or private lines using Ascii or bit-oriented code.

The system includes a CRT terminal with dual Zilog Z80 microprocessors, a 48K-byte dynamic buffer, 100K-byte minidisk drive, a 30 char./sec dot matrix printer and Franklin disk-resident control software.

The TC/2 also runs as a stand-alone system or as a down-link-loaded intelligent terminal. The TC/2 costs $7,850 or can be rented and leased for $375/mo and $150/mo, respectively. Franklin Systems is at 733 Lakefield Road, Westlake Village, Calif. 91361.

Converter Runs Off Terminal or Modem

DANBURY, Conn. — An asynchronous-to-synchronous converter that operates on power from the user's terminal and modem is available for $315 from Tri-Communications, Inc. at 155 Main St., Danbury, Conn. 06810.

The Asci-1 interface converter runs in the 1,200- to 9,200K bit/sec range.

It also features loopback switches to isolate malfunctions and confirm that components are operational.

Community College Installs Bar-Code Checkout System

By Jay Woodruff
CW Staff

BEL AIR, Md. — A terminal network similar to that found in supermarkets has helped a college located among northeastern Maryland's farmlands tighten up its library lending system.

While the on-line system at Harford Community College's Learning Resources Center is still some way from the point where it performs all the applications planned for it, it has still "given us greater control of what resources we have than we had before," according to Harold E. Stark, head of library services.

The center uses five IBM 3270 CRT terminals with on-line access over modems and phone lines to a 256K-byte IBM 370/125 mainframe and a data base of more than 56,000 book titles. Three of the terminals incorporate optical bar-code readers to scan material checked out of the center and the codes of student identification cards.

The school decided on the bar code system because the labels are easy to use compared with the traditional card-in-pocket checkout system. Instead of having to wade through the paperwork associated with a manual checkout system, library workers are free to use their time helping patrons find and use resource materials, according to Dr. Paul G. Yorkis, Harford's director for institutional development.

"Time out for each book is reduced, and there is the potential for a more rapid turnaround for our collection. It gives our staff the opportunity to learn new skills and the opportunity to work more with library users," Yorkis explained.

The system runs under IBM's CICS, "but it could have been authored in a number of languages," Stark said. "When we put the system together [in 1976], there were not a lot of packages available on the market. Now there are a lot of mass market packages that do what this one does, and some even surpass it."

To use the Learning Resources Center checkout system, each authorized library patron hands over an identification card and the materials he wants to take from the library to a circulation attendant. A bar-code reader is passed over the materials' barcoded labels and over the coded portion of the user's card.

That transaction is entered over phone lines into the 370's circulation files in another building and processed against two on-line master files.

The patron file contains data on each library user and the user's library transaction record. If that person has another book overdue or if the card is invalid, the CRT flashes an appropriate indication of the fact.

The materials file stores a bar-coded reference number for each of its holdings. If a requested item is out on loan, the borrower's name and the dates of the book loan and return are displayed.

The entire system was an in-house design, and it requires "a solid block of programming time" to be completed, according to Stark.

But it is not the school's only on-line system because interactive DP training is an integral part of the school curriculum, according to Yorkis. The 370 is also used for a variety of administrative and academic functions throughout this school of the 10,000 full and part-time students.

'Data! . . . Data! . . .'

Relax!

When you need electronic equipment without waiting, Leasametric can have it on its way to you in minutes.

Whether your requirement is for a week, a month or a year, there's one way to get the latest in electronic test equipment or terminals without waiting. Rent it from Leasametric.

Instantly, our nationwide on-line computerized inventory system will check our dozens of regional inventory centers to pinpoint the unit closest to you. Within minutes, your order is being processed and, in most cases, your equipment will be in your hands in less than 24 hours.

And, the Leasametric name means the equipment you rent is in working order when we ship it. Our regional maintenance laboratories are traceable to the National Bureau of Standards and every piece is thoroughly calibrated before it goes out the door. When you rent it from Leasametric, it works!

But renting from Leasametric means more than immediate possession. It's the one effective way to get the new equipment you need without going back to management for more money. There's no major capital investment with a Leasametric rental.

Plus, renting gives you a chance to check out the very latest models without committing to one manufacturer's hardware. Our continuously expanding inventory includes a multi-million dollar rental pool of over 33,000 items from the top 500 electronics manufacturers — including most items from the HP and Tektronix catalogs.

When you need it *now*, depend on Leasametric. To order, or for our latest rental catalog, call one of the relaxing toll free Leasametric numbers shown below. We'll get the equipment you need on its way to you in minutes!

Rent it and relax.

In the West
Call 800-227-0280
In California, call (415) 574-4441

In the Central U.S.
Call 800-323-2513
In Illinois, call (312) 595-2700

In the East
Call 800-638-4009
In Maryland, call (301) 948-9700

Leasametric
1164 Triton Drive, Foster City, CA 94404
A Trans Union Company

Auditing the Integrated Data Base

By James R. Krause

When a company centralizes and integrates its information processing through the introduction of data base technology, fundamental changes in the approach to DP auditing will have to occur. In addition, changes will probably occur in the organizational structure, responsibility for data input and accuracy and information data flows.

To the DP auditor, the changes to and the complexity of data element interrelationships could make the evaluation of control a difficult task. It is, therefore, the intention of this article to present a workable approach to auditing an integrated data base. But first, a few concepts need to be presented.

A data base is a way to organize and store data in a structure that models the natural relationships of data in the real world. It can be likened to a sophisticated cross-referencing system. For example, if information concerning a particular vendor were required for a purchase order, one would use the vendor identification, go to the vendor file and find the required information. Then, if payable information were required, one would use the vendor account number to find the appropriate accounts payable data.

Much of conventional data processing involved taking various files — such as purchase orders, vendor master and accounts payable — and extracting the needed information. But by correctly defining the natural data relationships to the data base, purchase order information will automatically be reflected in data maintained on a vendor or in a payable account.

When the same data is used in various sytems such as order processing and accounts payable, the data base becomes integrated. As a result of data base integration, processing is primarily data entry and reporting. The conventional processing of matching, merging and extracting data from various files has been eliminated. This change will affect the way an auditor should view and, therefore, audit any data base system.

Where to Start

Since changes to the organizational structure are likely to occur with the introduction of data base technology, a traditional answer as to where to start would be to obtain the new organizational structure. However, changes in the organization's structure do not lead to data base usage, but data base usage causes new responsibilities to be established. The proper first step, then, is to gain general knowledge and understanding of the data base management system (DBMS). Organizational impact will be analyzed in a later step.

Knowledge of the DBMS can be gained by reviewing vendor literature and by talking to the vendor and users of the DBMS. It is important that the auditor gain as much knowlege of the DBMS as possible independent of the organization's DP department. One's DP group might tend to be biased in favor of the DBMS it has selected. In addition, the final selection decisions tend to be based on performance characteristics and not necessarily upon control concerns. This occurs because DP departments generally try to process as much information as possible in the shortest time at the lowest cost.

To understand the nature of the DBMS, the auditor should know:

1. How data elements are defined.
2. How data record relationships are defined and any logical or software constraints.
3. The usage of each of the data manipulation language (DML) commands, what could happen if the wrong form of a command is used and the physical and logical results of command execution.
4. What facilities and capabilities exist for the backup and recovery of the data base.
5. What provisions have been made for journaling (audit trails).
6. How utilities are intended to be used and the consequences of their misuse.
7. The degree to which data independence can actually be achieved.
8. What security facilities are available.

Once the auditor feels comfortable in his base knowledge, the next step is to gain a general understanding of the types of systems and data contained in the data base. This is a macro-level approach and would only require knowledge of major inputs, processes, outputs and data relationships. The data base design example in the figure shows the level of detail deemed necessary.

Of the information comprising the data base, some elements may be more significant or critical than others. (In the example, actual invoice costs are more significant than an employee's history record.) Accordingly, management may have special security requirements surrounding this sensitive data. For example, government agencies have to comply with the Privacy Act, employee salary figures are not usually readily accessible or perhaps a special manufacturing process needs to be protected against disclosure to a competitor. Upon obtaining this security information, the auditor is ready to begin the first phase of analysis.

The DBMS on the market today offer a variety of facilities to protect and provide for data accuracy and security. However, because these software packages were designed for an "average" user, the capabilities of the DBMS may not provide the level of security and control an organization deems necessary.

In addition, various controls can be selectively used or have to be implemented manually. Therefore, the auditor must evaluate the DBMS capabilities in light of corporate control and security requirements and determine where exposures to errors and irregularities could exist.

Once this list of exposures and weaknesses has been compiled, the next process is to find out what procedures have been adopted to strengthen the data base environment. Design and implementation of standard procedures and practices for data base systems are the responsibility of a data base administrator (DBA).

One of the first organizational changes that occurs is the introduction of the new function of data base ad-

(Continued on In Depth/3)

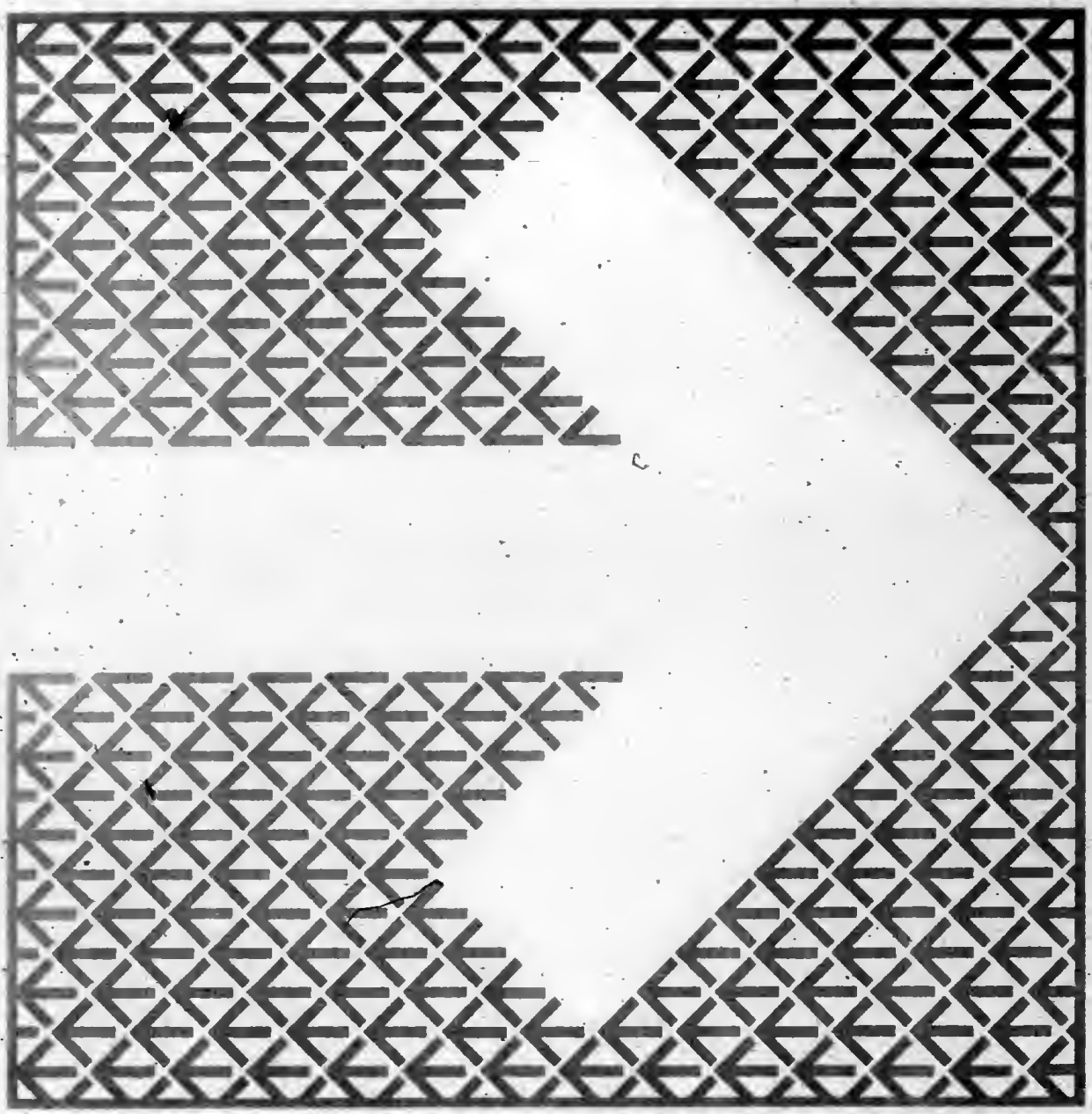
Model 204 DBMS

What happens when you need to change your existing database to meet new information requirements—new data, new reports, new structures?

With CCA's interactive Model 204 database management system, it's easy.

Our unequalled data independence makes any modification quick and simple. And our high-level user language holds your development time to a minimum.

For a complete system description, with case histories, clip your business card to this ad and send to Computer Corporation of America, 575 Technology Square, Cambridge, MA 02139. 617-491-3670.



BECAUSE MANAGING DATA MEANS MANAGING CHANGE

Computer Corporation of America

DATA BASE AUDITING

IN DEPTH

(Continued from In Depth/1)

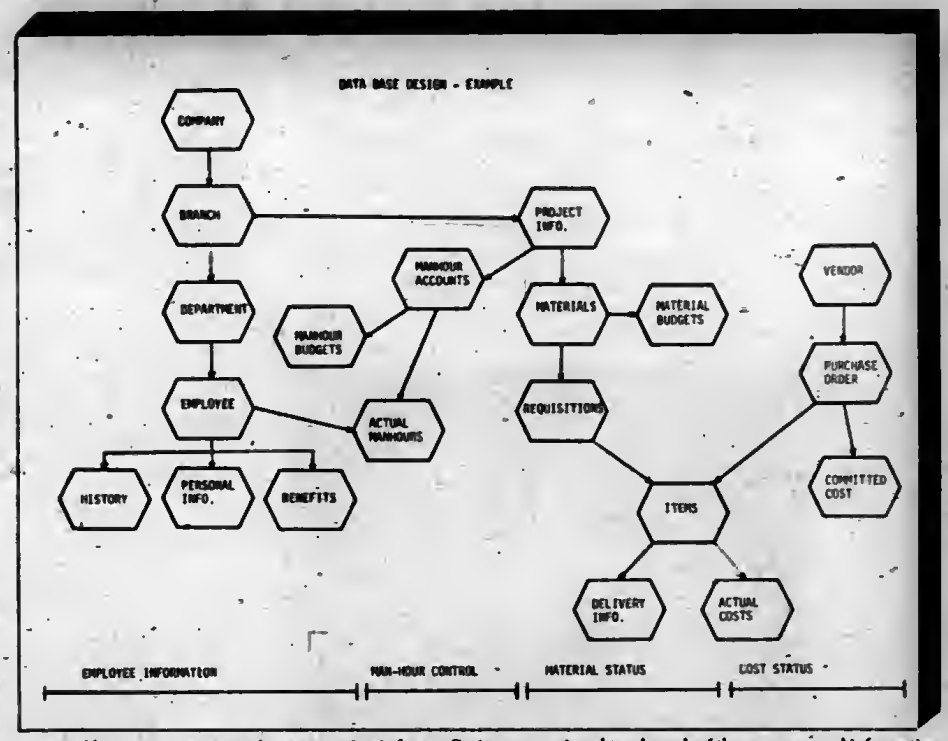
ministration. The DBA should be charged with the responsibility for data base control and administration. In this function, the DBA should:

1. Establish and review accesses to the data to maintain data integrity and security.
2. Establish and maintain the physical data base structure.
3. Define logical relationships to the DBMS based on user needs.
4. Maintain quality assurance of data base techniques and system interfaces.
5. Provide for the backup and recovery of the data base from unusual terminations and provide for appropriate audit trails.
6. Develop and communicate standards and procedures to both the user and DP communities to ensure effective utilization of data base technology. Standards should address at least the following:
   a) Conventions for data element definition and naming.
   b) Practices for DML usage.
   c) Utility usage.
   d) Application system design documentation requirements.
   e) Maintenance and control of data base documentation.
   f) Data dictionary updating and usage.
   g) On-line inquiry and control constraints.
7. Monitor compliance with all company directives and procedures.

Review of these major functions leads to the conclusion that the DBA is a major control point in the data base environment. To a certain extent, this is true. However, the DBA should only be responsible for maintaining the physical data base, its performance and the integrity of the data irrespective of the applications processing against it. Establishment of logical relationships are the responsibility of the various application areas. Examination of the position description should reveal the DBA's placement in the organization, lines of authority, responsibilities and functions.

Recalling the list of exposures and weaknesses, analysis must be performed to determine whether the procedures developed by the DBA compensate for any DBMS shortcomings. Although the DBA can be looked upon as an important cog in the control environment, to a certain extent, he poses a threat. He has not only the knowledge but the ability to access and modify the data base.

In an integrated data base environment with all data redundancy removed, an error or irregularity affecting one record could have a disasterous effect upon the entire organization. This, coupled with the DBA exposure, demands that additional controls be developed to ensure the data's accuracy. But prior to investigating the need for additional control, one has to understand how the introduction of data base technology could change the organizational setting. Efficient and cost-effective controls can be implemented only when one accounts for organizational relationships.



Depicted here is a company in the construction industry. Projects are assigned to a branch of the company and information is maintained on the status of cost of materials ordered. In addition, man-hours are accumulated by project and by individual for proper control. For internal corporate needs, the company structure is maintained and all relevant employee information provided.

Organizational Impact

The major reason for implementing data base is the reduction in data redundancy which reduces storage costs and the problems of data synchronization and keeps the same data element updated in many different systems. Because of these factors, many users will no longer be required to enter data into their own system, since the data is already in the data base. In addition, some user groups, because they are nearest the source, may have to enter data they will not necessarily use.

To understand this concept, refer to the sample data base design and consider the situation of company payroll. In our sample company, we have a design engineer who works on a variety of projects during any given pay period. Payroll's primary purpose is to pay an individual for his hours worked, and most payroll systems also allocate the amount paid to a departmental expense account. However, to be able to correctly cost our project, the engineer's hours worked have to be distributed to the proper project manhour accounts. Therefore, a case could be made that an employee's time card should contain this time distribution and the project information should be entered at the time of payroll processing.

This should increase the overall processing efficiency of the organization by not having to enter project data separately, yet it would possibly be an added burden for the payroll department to process data it does not need or use.

This was a relatively simple example, but the concept is valid. Introduction of data base technology will have an organizational impact. It should be apparent that data is no longer application-dependent. The data base is a central source of company information, and it must be controlled as such. No longer does a simple file exist for a single user. One large master file exists for many users. Control of the data base now moves into the realm of what DP auditors call general DP controls.

(Continued on In Depth/6)

VAX PACS

PROCESS ACCOUNTING & CHARGEBACK SYSTEM FOR THE VAX-11/780 COMPUTER

The VAX PACS Process Accounting and Chargeback System is a comprehensive computer service management system for the VAX-11/780 which satisfies inhouse, commercial and Government job cost reporting requirements. VAX PACS has been designed by computing and accounting experts to address the needs of the user, system manager and financial staff. VAX PACS features automatic daily operation, easy and flexible specification of system parameters, informative report generation at all levels, and automatic detection of errors or missing data. VAX PACS is written in VAX Fortran-Four-Plus and is fully documented. It is provided with a simple installation procedure.

For further information, contact:

STI SIGNAL TECHNOLOGY, INC.
45 WEST DE LA GUERRA • SANTA BARBARA, CA 93101 • (805) 963-1852

Real-Time on VAX. Ask any user.

"With our intensive real-time demands, VAX is clearly the machine for the job."

Willfried Muller, VAX System Manager
Institute of Nuclear Medicine
German Cancer Research Center
Heidelberg, Germany

The Institute for Nuclear Medicine at the German Cancer Research Center uses gamma cameras, ultrasonic scanners and X-ray computer tomography for the detection of tumors. These processed medical images are also used as input data for surgery and radiation therapy treatment planning.

For these applications, the Institute needed a powerful computer.

Willfried Muller, VAX System Manager, tells why they decided on Digital's VAX-11/780: "We needed a machine that would not only process images quickly, but also help us develop new programs for our applications. In both areas, VAX seemed to be ideal."

VAX's accessibility was also critical: "Our user community includes many different types of people. The fact that VAX is interactive and easy to use is very important to us.

"Also," Muller continues, "our image processing work made VAX's large program capacity very attractive. It can hold several big matrixes simultaneously. Equally important, VAX can be expanded to meet our requirements for years to come."

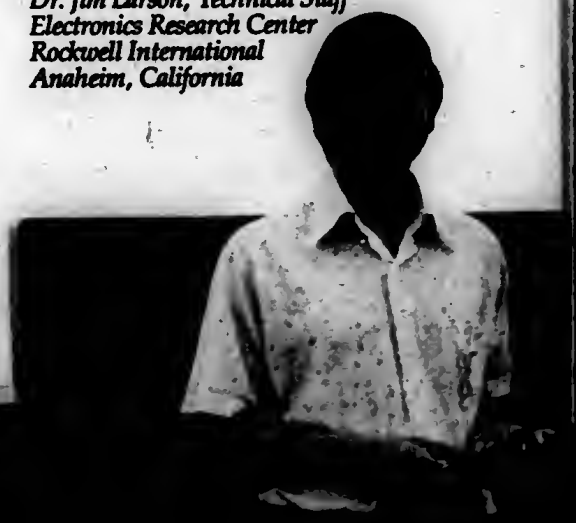
On ease of program conversion, Muller says, "We're finding it as simple as Digital promised."

And according to Muller, VAX's price/performance ratio has proved "very favorable."

Concludes Muller, "We don't know of another machine anywhere that could handle the job as well as VAX."

"VAX's real-time capabilities are even better than we expected."

Dr. Jim Larson, Technical Staff
Electronics Research Center
Rockwell International
Anaheim, California



Scientists at the Information Sciences Laboratory at Rockwell International Electronics Research Center are developing computer applications such as target-spotting identification and tracking, image enhancement, and speech processing.

For such state-of-the-art research they needed a state-of-the-art computer. They chose Digital's VAX-11/780

According to Dr. Jim Larson, member of the technical staff at Rockwell International, "VAX gives us great real-time response. With our old mainframe computer, we had to suspend all of our other user processes during real-time digitization. But VAX's FORTRAN is a lot more powerful. On VAX you never even know when something is being digitized.

The fact that VAX is able to handle real-time and interactive analysis simultaneously is a feature that's especially attractive. Says Larson, "Our people only have to learn and use one computer."

"VAX's large address capacity makes it a powerful real-time machine."

Dr. William E. Drummond, Chairman
Austin Research Associates
Austin, Texas

At Austin Research Associates in Austin, Texas, plasma physicists are using VAX to conduct far-ranging scientific research on the collective acceleration of sub-atomic particles.

"We chose VAX because it provided the ability to directly address very large data arrays. And that is crucial to each of our applications," explains Dr. Drummond, Chairman at Austin Research.

"VAX has the capacity to acquire data simultaneously from 15 different experimental sensors, digitize it, and immediately present results to our researchers. And furthermore, "Drummond adds, "VAX gives us a perspective we never had before by rapidly providing data comparisons with thousands of earlier test results.

"In addition, while VAX is supporting several interactive users it can also handle our large number-crunching simulation programs, allowing us to off-load a CDC mainframe," says Drummond.

Digital's VAX-11/780 has redefined the level of performance you can expect from computers in its price range.

If your application requires high-speed real-time calculation and large number-crunching capability, there is simply no better system.

But don't take our word for it. Send for our new brochure. And listen to our customers.

☐ Please send me the new "VAX—Ask Any User" Brochure and detailed Technical Summary.
☐ Please contact me.

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____

My application is ☐ Education ☐ Medical ☐ Laboratory ☐ Engineering ☐ Government ☐ Resale ☐ Other

Send to: Digital Equipment Corporation, MR1-1/M55, 200 Forest St., Marlborough, MA 01752. Tel. 617-481-9511, Ext. 6885.

B-S-10-0

digital

IN DEPTH

(Continued from In Depth/3)

One last point to remember is that the data base will exist in the DP environment. General DP controls, just as they applied in the conventional file environment, are needed to support the data base environment. What is important to recognize is that in a data base environment the distinction between general DP controls and application controls becomes more nebulous.

System Review

So far, this article has addressed those areas which could be called environmental concerns, DBMS capabilities, DBA standards and procedures and the organizational impact. The ultimate concern is whether the data is complete and accurate. The final, although most time-consuming phase, will be a review of the application systems, those systems which process and use the data.

As can be seen from the sample data base diagram, an integrated data base could be divided into systems. However, lines between systems are not clearly defined because an individual record type may participate in more than one system (integration).

The evaluation, if possible, should be broken down into a review of each system, but with special attention being paid to the points of integration. This piece-meal approach is proposed for two reasons. First, the evaluation of control is simplified by the reduced size and the logical relationships that exist between data elements. Second, an evaluation of the control requirements for integration points can be obtained by understanding the control needs in each system.

The starting point for reviewing a system is understanding what the system is to do and how the processing objectives are to be met. For the employee information system, the objectives are to maintain the company's organizational structure and to provide information on an employee for payroll and government reporting requirements.

At this point the auditor determines in detail how the information is to be used and the extent to which controls need to be established. The auditor must get down to the data element level of detail. For each data element (name, salary, Social Security number and so forth) a determination must be made as to whether the data element is critical or significant in light of the processing objectives of the system. For example, for payroll processing, the accuracy of the salary figure is highly critical, yet the accuracy of an employee's Zip Code is rather less significant.

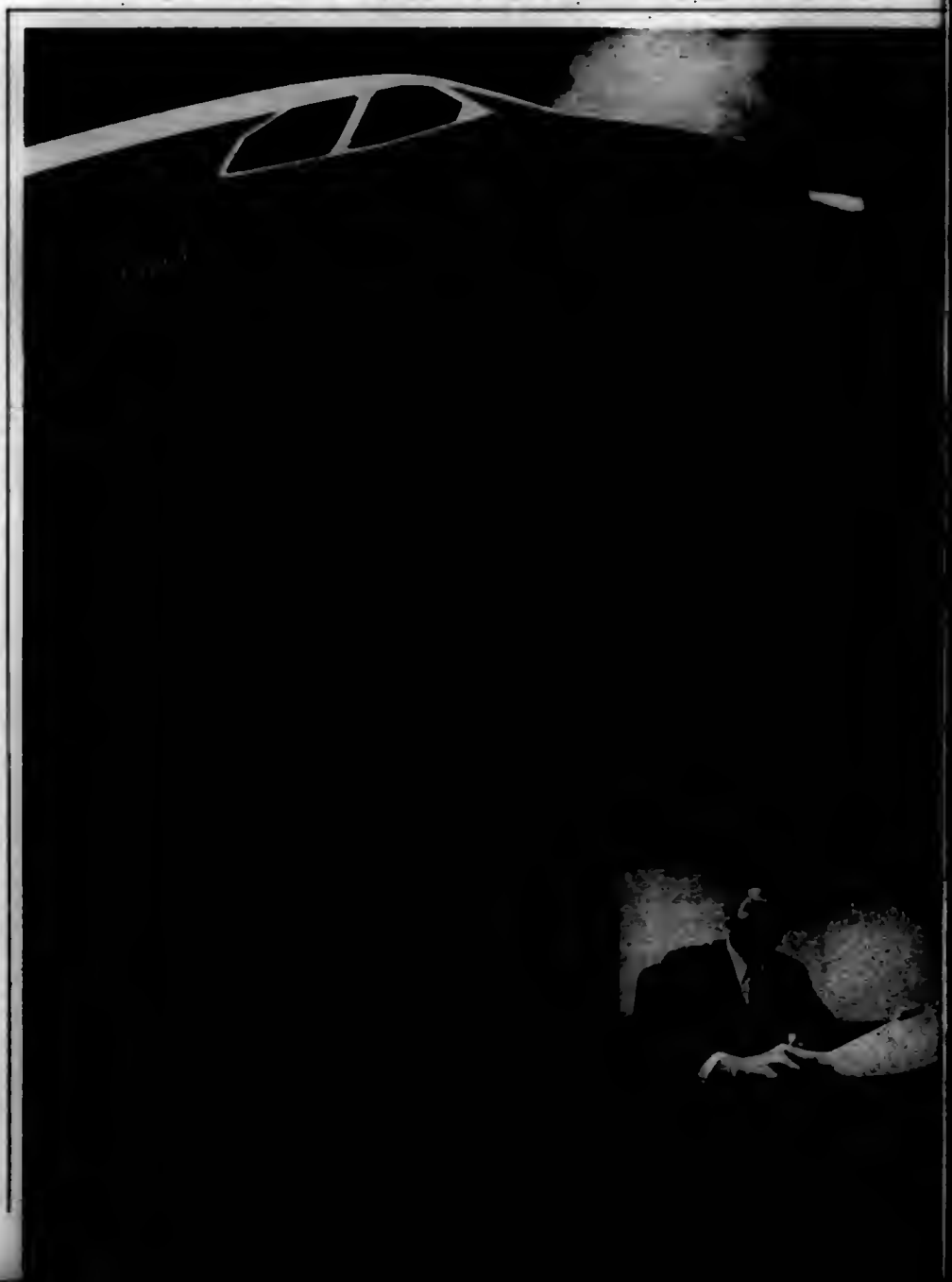
All the defined usages of an element can be obtained from the data dictionary. All uses of the critical elements must be identified so that a determination of control adequacy can be made. Since various data elements will appear in a multiplicity of applications, at different times, and with the likelihood of different control requirements, how is it determined if controls are adequate? The following criteria, although simply defined, should provide the guidelines needed for control evaluation:

1. Comprehensive and effective editing and validation criteria should be designed to capture the maximum number of possible errors at the time of data entry. Feedback must be given to the users detailing action taken as a result of transaction.
2. Periodic file balancing, scanning and correcting operations should occur to ensure data integrity over time.
3. Control totals should be reconciled with processing results when appropriate.

To state these criteria a little less formally, we want to ensure that only accurate, complete and valid data is entered into the data base and that the data is periodically checked to ensure its accuracy, completeness and validity.

The concept of periodic balancing could be one of the most important control procedures in data base systems. This balancing or data validation needs to be accomplished independent of normal processing because, in an integrated environment, one data element will be used at different times by many different systems.

Consider the following. Most payroll systems balance or validate employee salary rates before processing. By itself, this is a good control procedure for payroll processing since any error



in rates would be identified prior to processing the payroll.

But let us imagine that payroll occurs on the 15th of the month, but we cost projects at the end of the month. All through the month, employee rate changes are occurring, and the data base is updated, but an error is made. It is conceivable that this error could affect the project costing and go undetected since the month-end processing would be completed prior to the next payroll rate validation.

The question arises as to whether the project costing staff should maintain a control procedure to verify its processing accuracy. To them, the responsibility for salary rate accuracy belongs to the payroll function. In addition, the engineer may charge hours in one pay period, but not another. Therefore, it is unreasonable to expect project costing to maintain this type of control unless they maintained their own rate master file. But, maintenance of a separate file is against the philosophy of data base use.

Therefore, a primary user should be designated responsibility for a data element's accuracy. Then, that user must periodically ensure the data for which he is responsible is verified, regardless of whether that user's application is processed. The frequency with which the periodic validation should occur will be dependent upon the use and criticality of a data element.

By placing all the eggs (data) in the same basket (a centralized data base), an organization increases the risk of a single error having a significant impact. The advantages of data base use are many, but unfortunately, the risks can also be great.

Conscious Effort

Overcoming the potential weaknesses requires a conscious effort on behalf of both the DP community and the system users. Different ways of maintaining control must be implemented because of the changes in technology. One cannot assume that a technique that worked in the conventional file environment is adequate or even desirable in the data base environment. The data base is a resource of the company, and it must be controlled irrespective of the applications processed against it.

The auditor must evaluate the adequacy of the data base environmental controls (DBMS, DBA standards, organizational changes) and then proceed to determine whether the application control procedures complement the environmental controls to ensure data accuracy. Although this approach is time-consuming, the results of inadequately controlled and poorly implemented integrated data base systems can be unacceptable to any organization.

James R. Krause is supervisor, corporate audit at Pullman, Inc. in Chicago.

He is responsible for DP auditing on a worldwide basis for all divisions of the company. Previously, he was manager of a DP control section and has held various programming positions in the company.

Krause holds a B.S. degree in computer science from Michigan State and an MBA from Southern Illinois University.

SERIES 80 TOTAL®. WILL YOU STILL BE SOLD ON YOUR DBMS AFTER YOU'VE BOUGHT IT?

Often, a not so funny thing happens between the time a company buys a data base management system and the time they get their applications up and running. As problems arise, people start having second thoughts. Sometimes, they even have second thoughts about their commitment to an information system.

International Data Corporation (IDC), the independent research company, asked DBMS users, if they had to do it all over again, how they would change the packages they bought. And of the three leading packages, Series 80 TOTAL was the only one to emerge with a clean bill of health.

Users of other packages saw plenty of room for improvement. In telecommunication capabilities. In response time. In storage capacity. In ease of installation, learning and use. In file access capability. In simulation software. In front-end support. In the data dictionary. In overhead expense. And more.

ALL THE FEATURES NEEDED FOR SUCCESS.

But Series 80 TOTAL users said they were completely satisfied.

They reported that new applications get up and running right on schedule. They also say Series 80 TOTAL eliminates the need to recruit and train additional staff. Because it requires less than half the people other systems require.

Also, of the three leading data base management systems, Series 80 TOTAL was the only one that didn't involve additional conversion/development costs.

MORE USEFUL TO MANAGEMENT

Moreover, Series 80 TOTAL is the only DBMS that precisely mirrors your company's system of management. That's because with Series 80 TOTAL's data structuring capabilities almost any data relationship can be rapidly and easily defined.

Additionally, Series 80 TOTAL's modular step-by-step development capabilities are flexible enough to be adapted to change, quickly and inexpensively.

Many features and facilities that have made Series 80 TOTAL a success come from the experiences of more than 2,000 users who, over the last decade, used it in almost half their applications.

The end result is a DBMS architectured to accommodate distributed processing, data base machines, even migration to the new IBM 4300 (because it supports VSAM) and TIS, Cincom's revolutionary new Total Information System.

But don't take our word for it. Take the word of the users IDC surveyed.

Fill in the coupon below, or call Dennis Yablonsky, our national sales manager at (513) 662-2300, and we'll review all the pertinent details of the IDC study. You'll learn how Series 80 TOTAL has been designed and engineered for the '80's.

Contact us now. Because a DBMS should be as attractive after the sale, as it was before.

Please bring me proof of why Series 80 TOTAL outperforms the competition.

Name _____ Title _____

Company _____

Address _____

City State _____ Zip _____

Mail to: U.S.A.: Department D C, Cincom Systems, Inc., 2300 Montana Ave., Cincinnati, Ohio 45211. (513) 662-2300
International: Cincom Systems International, 17-19 Rue Montoyer, 1040 Brussels, Belgium. (02) 511-6548

Cincom Systems
Systems Software Division

VOLUME DATA ENTRY SERVICES
KD HOTLINE
for INSTANT QUOTES
(800) 228-0410
TWX 9108220160
Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68106

STILL WAITING
FOR REPORTS?

PANSOPHIC
800-323-7335

Part 4: Survivability

SURVIVABLE SYSTEMS

The simple expedient of formally defining the process as the basic logical unit in a system, bounding its capabilities and then building an operating system that effectively manages such processes leads us to a powerful programming environment. We can now write multiuser applications that run in a multitasking, multiprocessor environment while concerning ourselves only with the problems of a single-user, single-thread application.

Figure 4-1

The multiprocessor aspect allows us a further extension of these capabilities. Since the system now has at least two processors, and since we have the option of adding two of anything else that might be critical, we have the opportunity to make the system highly fault-tolerant. We can create a system that will survive any single failure and many cases of multiple failures in that it will continue to perform functionally the same in the face of these failures. The user may notice a loss of capacity or responsiveness, but will not lose any of his capabilities. We will see that the structure and management of processes plays a big role in achieving this goal.

Hardware Duality

The first step in achieving survivability is hardware duality. If a critical hardware component fails, there must be another one that can be used immediately. Equally important are the paths to all components; if one path fails, there must be an alternate path to that component. For instance, if the processor to which a user's terminal is connected fails and he has no means to be connected to another processor, then so far as he is concerned the system has failed.

This leads to the concept of dual-ported devices in which each device controller has two ports, each of which can be connected to a separate processor. At any one time, one of the ports is being actively used and the other is dormant, playing a backup role. The processor connected to the active port is said to "own" the device.

As an example, Figure 4-1 shows a dual-ported printer. The printer (a normal, everyday, single-ported printer) is connected to a controller that can be driven either by Processor A or B via two independent ports. Each of these processors runs an I/O process which controls the printer via its connected port (remember that an I/O process must reside in the same processor to which the device is connected). Processor A currently owns the printer, and the operating system knows this. Therefore, interprocess messages containing data to be printed on the printer are routed to the printer I/O process in Processor A.

There are several failures that could cause this path to the printer to fail. Specifically, Processor A could fail, or logic in the printer controller port connected to Processor A could fail. In the former case, the operating system would realize the failure of Processor A and transfer ownership of the printer to Processor B; in the latter case, the printer I/O process would detect the fault in the controller and transfer ownership to Processor B.

In either event, subsequent interprocess printer messages are sent to the printer I/O process in Processor B. Therefore, providing the application process is written to reissue an I/O message in the event of an error, the failure of a processor or a device port is indeed transparent to the user insofar as his access to that device is concerned.

This is the fourth installment in a five-part series.

Unfortunately, in all devices there are simplex points of failure that will totally remove that device from service. For instance, the failure of a printer motor, or even common logic such as a line driver in the printer controller, will disable the printer. This can only be overcome by totally duplicating the device and its controller and making provision in the system for rerouting work away from the failed device to an alternate device. In the case of a printer, for instance, a sophisticated spooler would queue work for all printers on the system. If a printer failed, it would simply become unavailable to the spooler, which would continue to despool all work to the remaining printers. In many cases, the duplication of a device is not economically justifiable, and work for a failed device is simply held until the device once again becomes available.

There are two cases in which the continued operation of the device is every bit as important as the proces-

(Continued on In Depth/10)

By Wilbur H. Highleyman

IN DEPTH

(Continued from In Depth/9)

sors themselves. One of these devices is the interprocessor bus; without it, all paths but local paths within a processor are lost. Therefore, this bus must be duplexed.

The other case is disk files containing critical data bases and system files (program and process images). If a disk containing one of these files goes down and there is no alternate, the system does down. Totally. Furthermore, just having a backup disk is not satisfactory. It must contain completely updated files, that is, it must be a mirror image of its partner. As data comes in that updates one disk of a "mirrored pair," it must also update the other disk.

Figure 4-2 shows the configuration for a mirrored disk pair. Three levels of mirroring may be used:

- One controller and two disks (Figure 4-2a). However, if logic common to both disks fails, then access to both disks is lost.
- One controller per disk (Figure 4-2b). No single failure will prevent access to the data.
- Dual-ported disk devices connected to dual-ported controllers (Figure 4-2c). This adds an additional level of redundancy to the mirrored pair.

There is an important utility that must be available to support mirrored files if they are to be truly effective — an on-line disk copy utility to be used when a disk that is part of a mirrored pair is to be returned to service. When a disk unit fails, the files are now being handled by a simplex disk. When the disk is repaired or replaced with a spare and is to be put back in the system, it must be brought back to its mirrored condition — that is, contain an exact copy of the other disk — even while further modifications are being received for that data. That is the job of the on-line disk copy utility — to copy one disk to another while at the same time ensuring that file updates are kept current.

To summarize hardware duality, Figure 4-3 (on In Depth/11) shows a simple system with a terminal, printer and mirrored disk pair. Figure 4-3a shows how these peripherals might be configured physically. Figure 4-3b shows the logical process configuration as it would interact with an application process. Primary paths are shown as solid lines, backup paths as dashed.

One final point should be made about hardware duality in a survivable system. Duality is fruitless if a failed device cannot be repaired and returned to service while the system is running (this led to the need of an on-line disk copy utility for mirrored files). Therefore, any piece of hardware — including processor, buses, device controllers, power supplies, even fans — must be capable of being removed, repaired or replaced and plugged back in while power is still on the system and without inducing "glitches" in the system operation.

Software Duality

Just as each hardware unit must have a backup, so must each software unit, or process. Should the processor in which a process is running fail, then that process will cease to exist (and the capabilities it provides will be lost to the user) unless a spare process can be "switched in."

(Continued on In Depth/11)

This announcement is neither an offer to sell nor a solicitation of an offer to buy any of these securities. The offering is made only by the Prospectus

February 1, 1980

1,014,550 Shares

DENELCOR, INC.

Common Stock

Price: $4.50 Per Share

Copies of the Prospectus may be obtained in any State where these securities may lawfully be offered by the undersigned and such other dealers as may lawfully offer these securities in such State.

John Muir & Co.

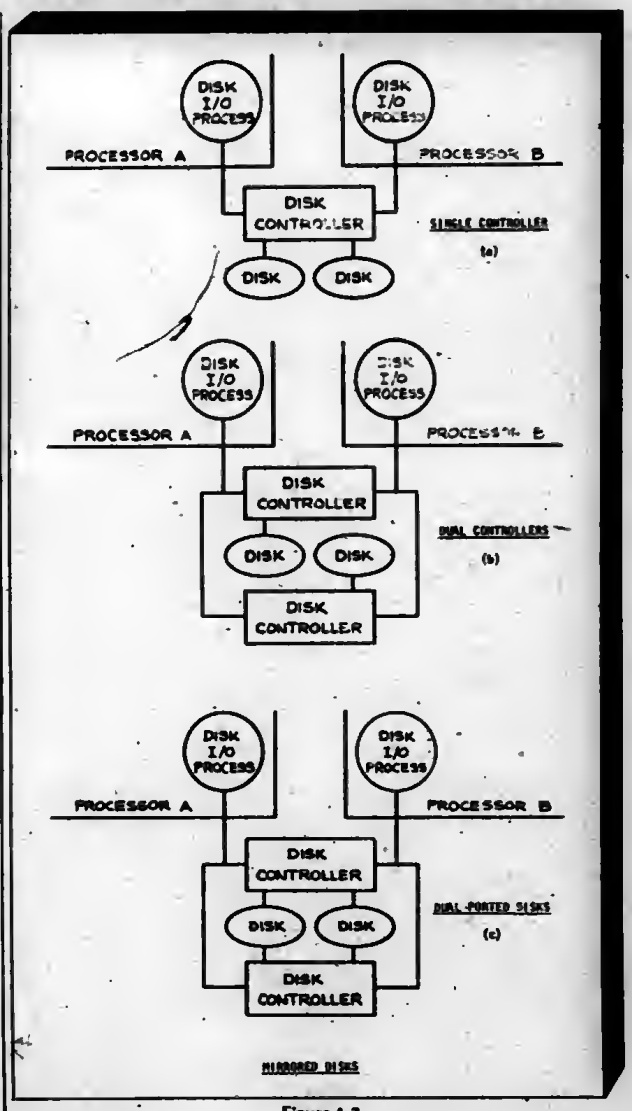


Figure 4-2

SURVIVABLE SYSTEMS IN DEPTH

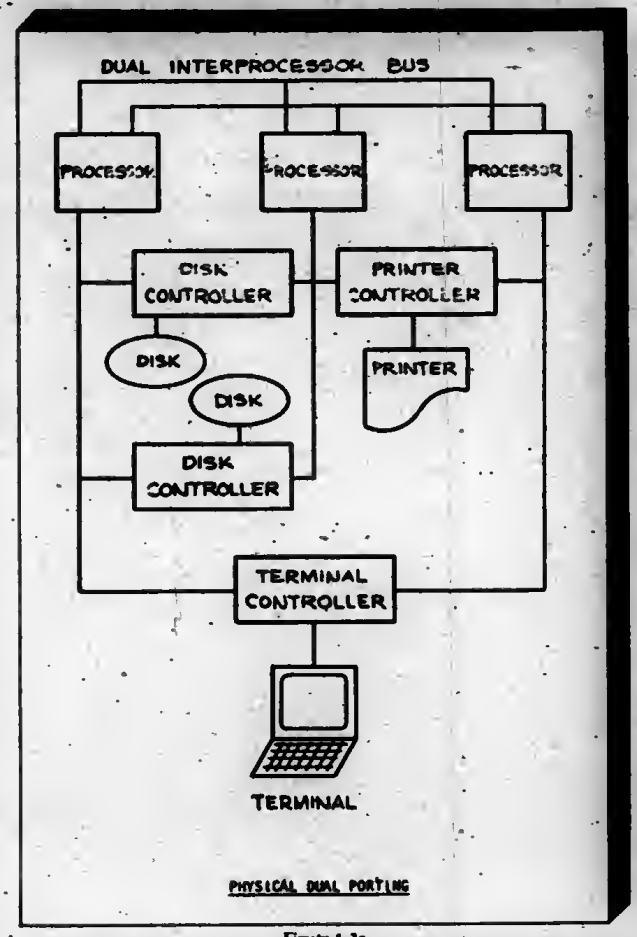


Figure 4-3a

PROCESS NAME	PRIMARY PROCESSOR	BACKUP PROCESSOR
INQUIRE	3	2
MAINT	2	
REPORTA	4	1
•		
•		
•		

Figure 4-4

(Continued from In Depth/10)

This requires two capabilities of the process:.

- It must be able to create a backup copy of itself in another processor whenever it is created or has taken over from a failed process.
- It must be able to keep its backup informed of what it is currently doing (for instance, what transaction it is currently working on) so that the backup can continue its work uninterrupted should the primary process fail.

Backup Process Creation

Let us first consider the creation and management of the backup process. Assume that Process A has been created. One of the first things Process A does is to request the operating system to create a backup copy of itself in another processor; we will call this backup Process A'. It has the same name as Process A, but is created and runs in a different processor. A' detects that it is the backup (because it can sense that its brother already exists) and immediately calls a monitor procedure (Checkmonitor in the Tandem Computers, Inc. system) that is responsible for monitoring the primary process and taking over in the event of primary failure. The monitor procedure is provided by the operating system.

Just as the operating system must know of Process A so that it can route interprocess messages to it, so must it know about Process A'. As we discussed earlier, it knows about Process A and all other processes in the system via the process directory, a copy of which is maintained in each physical processor. Let us now extend the concept of the process directory to the process pair directory (PPD). The PPD contains the name of each process, the processor in which the primary is running and the processor in which the backup, if any, is running. Figure 4-4 shows a part of a typical PPD.

As Process A is performing its duties, the operating system routes all interprocess messages destined for Process A to it. However, should Process A fail (most likely because of a processor failure, but possibly because of a software fault that causes the operating system to abort it), the operating system will look in the PDP and find that Process A in fact had a backup. It will send Process A' what appears to be an interprocess message indicating the Process A has failed and the reason for its failure (processor failure, abort or whatever). This causes the operating system in the Process A' processor to

(Continued on In Depth/14)

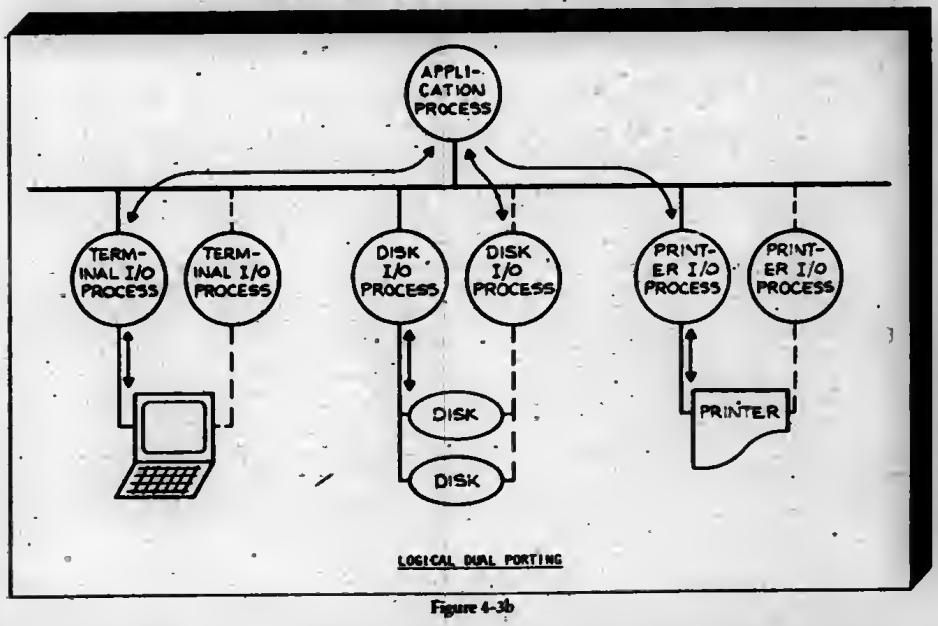


Figure 4-3b

Now that Infoton has changed its name to there's only one button to push for

We're General Terminal Corporation. GTC, for short.

Over the past decade, as Infoton Incorporated, we've come a long way by pushing all the right buttons for our customers.

In the decade ahead, as GTC, we'll be pushing even harder to become the only connection you'll ever really need, in display terminals.

And we don't have far to go.

Because we already have extraordinary products like the GT-101 and GT-400. Both right on the button for quality, versatility and reliability. Both with standard features that'll beat the options off their competitors.

Because we already have the capacity to deliver and service our products anywhere in the world, at push-button speed.

Because we're now the one and only display terminal manufacturer with major production and service facilities on both U.S. Coasts. So we can help you keep a button on today's ever-increasing freight costs.

And because we've always been willing to break away from button-down thinking. To try new-fangled innovations in the spirit of old-fashioned service.

So if you're ready for all these things today, and more to come in the years ahead... you don't have far to go.

Just push the right button.

General Terminal Corporation, all your display terminal needs.

GT-101	
ENGINEERING HIGHLIGHTS	
• Z-80 microprocessor	• Solid state keyboard
• Modular firmware	
STANDARD FEATURES	• Line drawing character set
• Block mode	• Printer interface
• Dual intensity	• ADM-3A mode
• Reverse video	
OPTIONAL FEATURES	• Composite video output
• 8-user programmable function keys	• 220 volt operation

GT-400	
ENGINEERING HIGHLIGHTS	
• Z-80 microprocessor	• Modular firmware
• Block/character mode	• Function keys (8 std./24 option)
OPTIONAL FEATURES	• Modem cable/modem printer cable
• Line drawing character set	• Hazeltine 2000 emulation
• 2 additional pages of display memory	• Time sharing option

For more information on GTC products and services, call toll-free today. In California, dial 800-432-7006; anywhere else in the United States, dial 800-854-6781. Ask for Barbara Worth. Or write Barbara Worth at General Terminal Corporation, 14831 Franklin Avenue, Tustin CA 92680. We have offices throughout the world. In Canada, contact Lanpar Limited, 85 Torbay Road, Markham, Ontario, L3R 1G7 416-495-9123.

GTC

GTC®

The right button to push.™

General Terminal Corporation

IN DEPTH

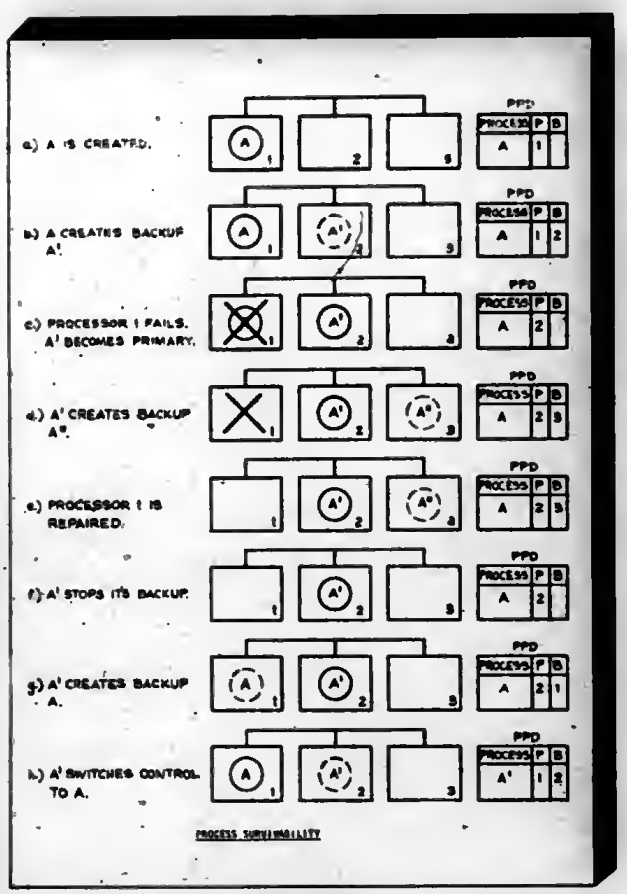


Figure 4-5

You Saw
The Reviews . . .
Now Get The Book

Quodata

(Continued from In Depth/11)

schedule Process A' that is, put it on the ready list). Further interprocess messages for Process A are now routed to Process A' for processing, and the system survives. At this point, Process A' may create its backup to protect itself from further failure.

Figure 4-5 shows a typical life of a process in the presence of a processor failure. A three-CPU system is shown in which Process A is created in Processor 1; it creates its backup A' in Processor 2. Later, Processor 1 fails and Process A' takes over, creating its backup A" in Processor 3. Subsequently, Processor 1 is repaired. The system could be left as is. However, in this case it is desired to restablish load balancing. Therefore, Process A'+ stops its backup A" and recreates a backup A in Processor 1. It then switches control to Process A, resetting the system to its initial configuration.

As can be seen, a variety of strategies can be employed to ensure system survival in a degrading system. Load sharing should be an important consideration in the strategy. The illustration has shown how a process can move itself from one processor to another by creating a backup in the new processor and then switching primary/backup roles. This capability could be used to dynamically balance the load in a multiprocessor system, either under operator control or under the influence of some monitoring process.

Checkpoint Messages

Having a backup process to switch to in case of a process failure is essential to surviving. However, if the system is to perform functionally the same in the event of a failure, the backup process must take over where the primary left off; this means it must know what the primary is doing.

Going back to our discussion of process structure, this is done quite simply as the result of one of the characteristics of the structure of a process. A process contains a code area and a data area. The data area comprises global data and a stack that is used to nest procedures, pass parameters between procedures and hold temporary data needed locally by a procedure. The state of a process is determined by the state of its data area; that is, give two like processes (two processes with the same code area) the same data area (and environment), and they will perform identical functions.

Therefore, if we could somehow maintain the data area of the backup process so that it is identical to the data area of the primary process, then if it started up following a primary process failure, it would behave exactly the same as if it were the primary process.

Unfortunately, the system load that would be imposed by constantly updating the backup's data area precludes such an approach. However, it is necessary only that the data areas be identical at certain critical points in the process's execution. For instance, if the data areas were made identical immediately following the receipt of a transaction to process, then if the primary failed after partially processing the transaction, the backup would start at the point at which the transaction was received and would reprocess it. In many applications, this would be acceptable.

The backup's data area is updated via a mechanism called "checkpointing." This is simply an interprocess message sent by the primary process to its backup, the contents of which are the current contents of the data area. Like other interprocess messages, the receipt of this checkpoint message by the backup process causes it to be scheduled to run. As described previously, the backup process is executing the monitor procedure; this procedure will receive the checkpoint message and store it in its data area, thus updating the data area as desired. Updating the data area includes overwriting the stack.

But the monitor procedure is also using the stack, so doesn't this destroy that procedure? It would if the monitor procedure used the normal process stack. Therefore the monitor procedure must create a pseudo-stack outside the range of the process's data area, where it won't get overwritten. Since the monitor procedure is really part of the operating system, it can play this kind of game.

If Primary Fails

Should the primary process subsequently fail, the receipt of a system-generated message describing that failure (as described previously) will cause the monitor procedure to return to the main flow of the process at the last received checkpoint. That is to say, the backup process takes over and starts executing according to the last checkpoint.

But how does the monitor know specifically which instruction it is to start executing? The program counter is not part of the data area and is therefore not sent over as part of the checkpoint message. This is handled via the last stack marked in the stack in the data area. Each stack marked indicates the place at which the current procedure was called and causes the current procedure to return to the instruction following its call when it has completed. The stack marker also contains the processor environment to restore upon the procedure's return.

When a process wants to send a checkpoint message, it does so by calling an operating system procedure that takes care of actually issuing the interprocessor message. Therefore, the last stack marker on the checkpointed stack was placed there as a result of the call to the checkpoint procedure, and it points to the instruction in the application program following the checkpoint call. When the monitor procedure wants to turn on the backup process, it simply executes a procedure return according to the last stack marker; that is, the backup process will turn on at the instruction following the checkpointed call, as if it were exiting the

(Continued on In Depth/16)

NEW SPEEDIFORM.

9 FEATURES SAVE TIME, TROUBLE AND MONEY.

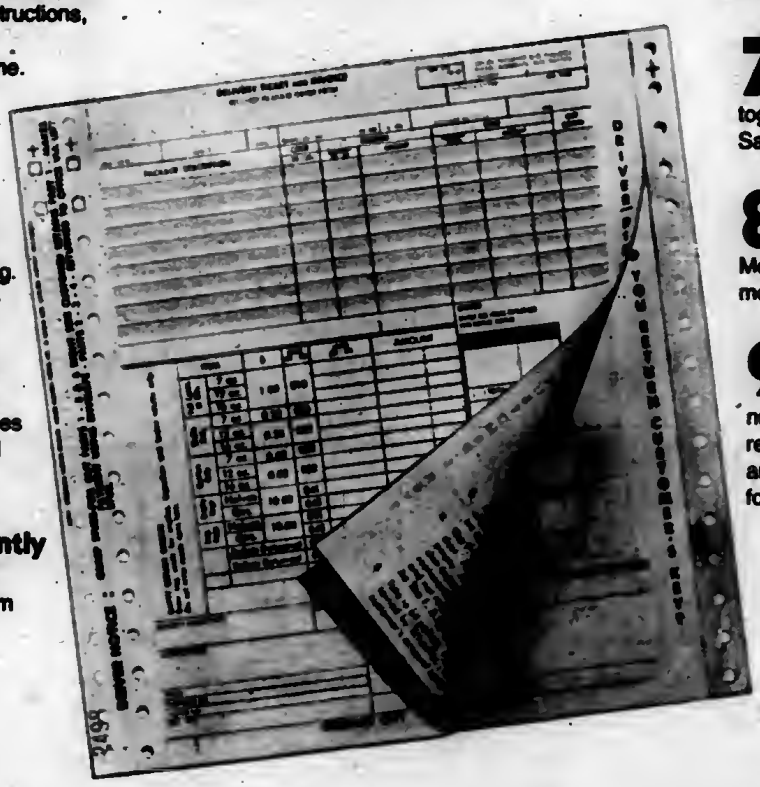
1. Systems versatility in a carbonless form. Speediform® lets you combine different forms, envelopes, pasted pockets, postcards and other special constructions, up to 8 parts in one formset. Reduces form cost, saves time.

2. Faster, easier feeding. Only two parts pass through the tractors no matter how many parts are in the Speediform. Reduces tenting and jamming.

3. Works with any printer: computer, word processor or typewriter. Cuts forms inventory, simplifies ordering, ideal for distributed data processing.

4. Separates instantly for distribution any way you want. Saves form handling time.

5. Keep two parts together, separate other parts instantly. Speeds subsequent processing, saves labor.



6. Separate into two complete formsets for further processing. Saves time and labor, speeds distribution.

7. Remove parts you need, keep others together for further processing. Saves time and labor.

8. No carbon paper to remove or dispose of. Moore Clean Print® eliminates mess, reduces cost.

9. Cuts forms costs up to 50%. Any number of Speediforms can be removed from the tractors at any time, so you don't waste forms.

Complete the coupon to find out more about

SPEEDIFORM. THE ONE FORM THAT DOES IT ALL. NEW FROM MOORE.

MOORE BUSINESS FORMS, INC.

1205 N. Milwaukee Ave., Glenview, IL 60025
800-323-8325/Illinois call 800-942-8330

CW2-18-80

☐ **TELL ME MORE ABOUT NEW SPEEDIFORM**

Name _____

Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Telephone _____

IN DEPTH

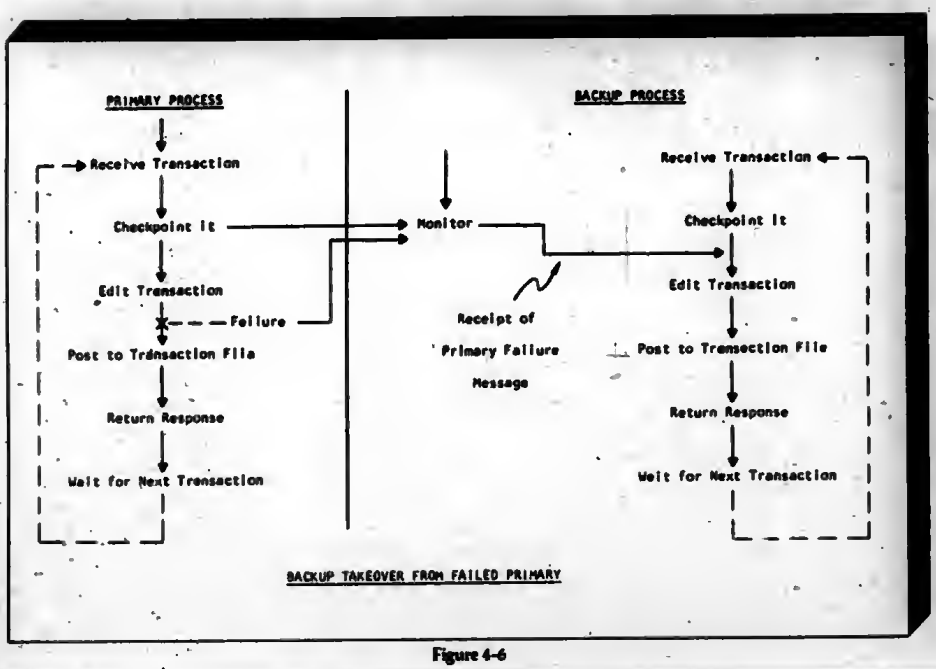


Figure 4-6

(Continued from In Depth/14)
checkpoint procedure. This is illustrated in Figure 4-6.

The checkpoint procedure also returns with a status condition. This status condition normally indicates success when the primary process is running. However, if the backup process is turned on, the monitor procedure forces an error status that indicates that the primary failed and why. This allows the backup process to perform special takeover logic, should any be required.

In actual practice; it is usually not necessary to checkpoint the entire data area. The global data often contains a large data base, whereas the stack is typically small. Since large (multi-K-word) checkpoint messages would represent a large bus and processor load, it is advantageous to send over just that part of the data area that has changed since the last checkpoint. This often is simply certain elements of the global data plus the stack.

In some cases, it may not even be necessary to checkpoint the stack. If certain messages simply update internal parameters, it is necessary only to process the message, update those parameters and then checkpoint the changed data. In this case, the stack is

FORESIGHT®

UCS

FORESIGHT and INFONATIONAL are now available on these minis:

PRIME
HP 3000
DEC 11/70
DEC 11/34
DEC 10
DEC 20
TANDEM
B-1700

United Computing's FORESIGHT® and INFONATIONAL® are proven performers in the business and financial arenas. And now, both are available on a variety of mini computers.

FORESIGHT is an executive management, planning, and reporting tool. It is used by hundreds of companies, including more than 150 of the "Fortune 500" companies.

INFONATIONAL is a comprehensive, easy-to-use, highly flexible and fully integrated accounting system. Its modules include: General Ledger, Accounts Payable & Purchase Order, Accounts Receivable & Sales Analysis and Fixed Assets.

Financial Modeling

FORESIGHT is a powerful management tool used to assist key personnel in making fast, accurate and effective financial decisions. It allows management to spend more time analyzing alternatives and opportunities.

FORESIGHT asks the question "What if?" in such areas as strategic planning, cash requirement planning, capital budgeting, cash management and management financial reporting. And it is integrated with the INFONATIONAL General Ledger.

General Ledger

The General Ledger furnishes the information required to manage day-to-day operations as well as the information needed to make sound business decisions about the future. It includes a comprehensive budgeting module, and is interfaced with FEDTAX.® A powerful flexible report writer allows management to generate whatever "customized" reports they need.

not checkpointed, so backup processing would resume at the last point at which the stack was checkpointed, rather than at noncritical checkpoints.

Checkpoint Strategies

The basic concepts of survivable processes are quite straightforward — create backup processes and keep them informed at critical processing points via checkpoint messages. Checkpointing does represent a significant system load and should not be used casually. Checkpointing strategies should be carefully thought out in terms of minimizing the number of checkpoint messages and checkpoint lengths, while achieving the degree of fault transparency desired in the system.

More important, these strategies must be established as part of the design of the process. It is not sufficient to implement simplex processes initially without giving thought to survivability and then worry about where to put the checkpoints later. This can lead to a process organization in which the checkpointing task burden is so large it cannot realistically be carried.

Let us explore various levels of checkpointing. As we have said, the level of checkpointing should be commensurate with the level of fault transparency desired. Consider an inquiry application in which the operator enters an inquiry, a file is searched and data is returned to him. In many situations, it may be quite reasonable to ask the operator to reenter the inquiry in the rare occurrence of a system fault that has interrupted the inquiry process. No checkpointing need be done at all: should the backup process find it has taken over, it might simply send a repeat request to all operators, not knowing which ones had active inquiries.

An even better situation is the above, but one in which the terminals buffer the inquiry and pass it to the system in response to a poll. In this case, the new primary process need only poll all terminals; those with unanswered inquiries would retransmit those inquiries for reprocessing. Full fault transparency has been achieved without checkpointing.

However, if it is not desirable to request the transaction again from the operator once it has been received, the process can checkpoint it as soon as it receives it and then process the inquiry. In this case, it the process fails, the backup has the transaction and will reprocess it without having to request it again. The operator will receive a response without ever knowing there was a fault.

In this case, if a failure occurred after the system had responded to the last inquiry and before it had obtained the next one, the response to the last inquiry would be retransmitted to the operator since the transaction is being totally reprocessed. If this is undesirable, a second checkpoint is required following the return of the inquiry response.

File Updates

Unfortunately, applications usually aren't this simple. Typically, a transaction is used to update a file. The simplest case of this is when the transaction is simply logged to a transaction file for later processing. In this case, all of the aforementioned strategies hold. If the operator or terminal can be requested to resubmit the transaction, no checkpointing is required. Otherwise, the transaction should be checkpointed when it is received.

In all of these cases, a failure could cause the transaction to be logged twice. Often, the processing programs can handle the case of duplicate transactions (transactions may carry serial numbers, for instance). If this is not tolerable, then (as above) the process should checkpoint following the logging of the transaction to cause the backup to pick up at this point.

Often, however, the transaction is used to perform an on-line update of a file. In this case, a record must be read, modified according to the transaction and then rewritten. Whether or not the transaction was checkpointed when it was received, it is imperative that it and the record be checkpointed when the read of the record has been completed. Otherwise a double update could occur (unless this is allowed).

Consider a transaction that contains a count which is to be added to a field in a record. If the transaction is simply reprocessed following a failure, it would be added again to the field if the first transaction had completed. However, by checkpointing the read record and assuming a failure after the transaction had been completed, the backup process would continue from the point at which the read had completed. It would add the transaction count to the original field and return the record, overwriting identical data left behind by the primary process.

So far as transaction processing is concerned, this is the case of most general interest and is shown in Figure 4-

(Continued on In Depth/18)

INFONATIONAL®

Fixed Assets
This module is designed to help you take advantage of the latest tax legislation. It features full transfer capabilities, investment tax credit and recapture, depreciation of both tax and corporate books, (even if unique depreciation rules are used), and automatic switching to straight-line depreciation at the optimum time. And the system has an optional Asset Depreciation Range module. A flexible report writer allows you to generate reports for your special needs.

Accounts Payable & Purchase Order
This module generates a full series of distribution, disbursement, and cash requirement reports, standard cost variance reports, automatic calculation of discount and due date reports to control the payables process. Or, with the flexible report writer option, it can generate any customized reports you need. And the Purchase Order module provides a full range of tracking, matching and reporting capabilities.

Accounts Receivable & Sales Analysis
The Accounts Receivable module reduces costs while maximizing profits. You determine profitable marketing plans through expedient reporting on your product mix, by controlling collections, optimizing cash flow, and properly reporting sales statistics.

More Technology from a Communications Leader.
FORESIGHT and INFONATIONAL are products of United Computing Systems, a wholly owned subsidiary of United Telecommunications. Both products are supported by experienced consulting and training groups.

For more Information
To find out how FORESIGHT or INFONATIONAL relate to your mini, mail this coupon to: Director of Marketing, Business Information Products Division, DEPT. "C", United Computing Systems, Inc., 2525 Washington, Kansas City, Mo. 64108. Or call: 816 221-9700, ext. 540.

CW-8-80C
Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Business Information Products Division

UNITED COMPUTING SYSTEMS
People, systems and solutions United

IN DEPTH

(Continued from In Depth/17)

7. The first checkpoint is needed only if the transaction cannot be requested again from the user. The middle checkpoint is needed only if a double update is not allowed. The last checkpoint is needed only if a repeat response cannot be tolerated.

Most processes, whether they deal with transaction processing, external event control, communication switching or whatever, can be framed as subsets of Figure 4-7. Therefore, we can see that the usual worst case for a transaction is three checkpoints.

It is important to minimize the number of checkpoints because of the system overhead they create. Sometimes no checkpoints are required. It is very often possible, and should be a general design goal, to design the system so that no more than one checkpoint per transaction is required. However, considerations to allow this often range throughout the system, from operating procedures (reentering a transaction) to terminals (block transmit, ignoring unexpected responses) to processing functions (detecting and ignoring duplicate transactions). Therefore, the determination of checkpoint strategies belongs in the very early stages of design and is not a candidate for afterthought.

Checkpointing Pitfalls

While the basic concepts of checkpointing are fairly straightforward, there are certain traps into which one can fall. We will mention a few here.

One obvious problem can occur if multiple processes are updating a single file in a checkpointed application. Keep in mind that a checkpoint follows the read of a record; assume that the checkpoint following the rewrite of the record is deemed unnecessary. Process A updates a given record. Shortly thereafter, Process B successfully adds other data to that record. Then, before it is asked to do anything else, Process A fails. Its backup resumes at the last checkpoint, reupdates the record (a copy of which was passed in the checkpoint message) and rewrites the record. This overwrites the record last written by Process B; Process B's update is lost. This occurs even though the file was properly locked during each update.

Checkpointing after the write can avoid this, but adds overhead. Therefore, it is often desirable to have a given file updated by a single process — the data base manager for that file.

Another problem is "windows." A window is a brief interval during which, if a fault should occur, data is lost or operation is indeterminate. One example of a window is a failure during operator entry from a nonbuffered terminal. Unless this data is being read by both processors connected to the terminal controller, this data will be lost. (Dual reading is a problem, since without read interprocess requests being received by the backup I/O process, it does not know when the last read became satisfied, thus establishing which data is currently active.)

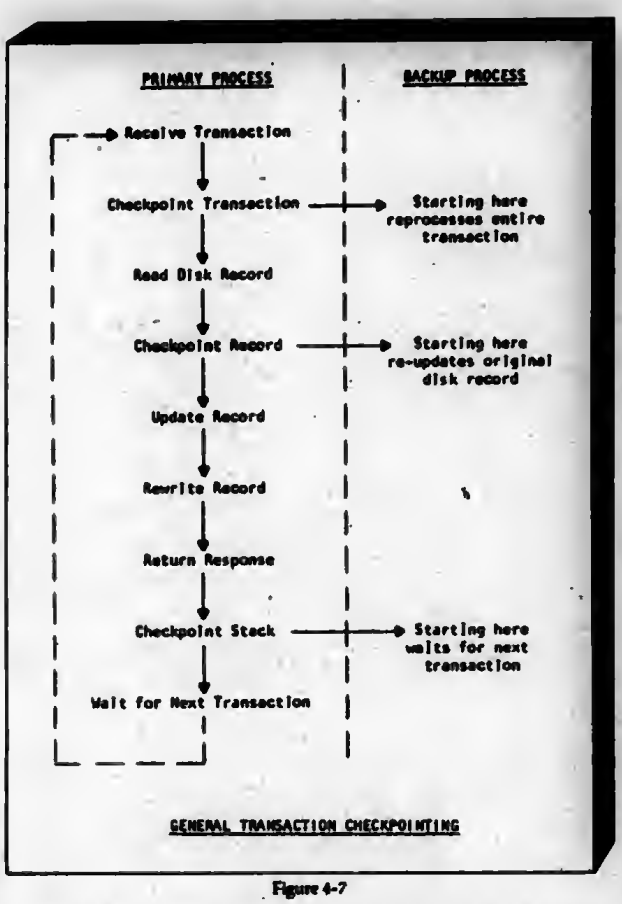


Figure 4-7

Lost operator data simply results in a degree of fault nontransparency. A more severe problem is a failure of a process during a disk write. When the backup takes over, it does not know if the disk write had not yet been initiated or had completed but the primary process had not yet checkpointed. If this operation were writing a record to the end of file, for instance, and the backup reissued the write, the record might be duplicated.

This problem can only be solved at the system level. Tandem solves it by carring a synchronization count with each critical disk operation for each process.

Other critical situations that can exist at proces failure time involve pending interprocess messages. There are several cases to consider. Let us define the "source process" as the originator of the message and the "destination process" as the recipient of the message. Consider the following cases:

- The source process sends a message and awaits a reply. It then notifies its backup via a checkpoint message that it has received a reply. What if the source process fails while it is waiting for the reply? Is the reply rerouted to the backup source process? If not, the backup source process will reissue the message, thus causing the destination process to receive a duplicate message, which it must then recognize as such if duplicate processing is not to be allowed. (The protection against duplicate critical disk operations described above is such a case solved within Tandem's Guardian.)
- The source process sends a message and awaits a reply. The destination process receives the message, checkpoints it to its backup and then fails. The backup takes over, processes the message and returns the reply. Has the return path been reestablished to the source process? If not, the source process must be able to detect the failure of the destination process and reissue the message. The destination process must be able to recognize this as a duplicate message and respond to it, but otherwise do no other processing.
- Several source processes have sent messages to a destination process. These messages have not yet been read by the destination process (they are still queued to it) when the destination process fails. Are they rerouted to the backup process? If not, this is a variation of the above case. The source processes must detect the failure of the destination process and reissue the messages.

The extension of a process to include the capability of creating its own backup and keeping its backup informed via checkpoint messages provides the capability for the programmer to easily build survivable processes in a multiprocessor environment. The system is made truly survivable by ensuring that there are dual paths to all peripheral devices and that all critical files are mirrored. Primary/backup role switching also allows load balancing to be accomplished dynamically in the system.

The proper strategy for checkpointing can be a difficult design task ranging across many considerations outside the realm of program design, including operational procedures and peripheral specifications. Once these are established, however, the implementation of the checkpointing strategy is little more than trivial. Particular care must be paid to lost and duplicate messages. Potentially, lost messages must be repeated, leading to the certainty of duplicate messages which must be detected and handled properly.

Next week: Throughput.

Dr. Wilbur H. Highleyman is president of Sombers Associates, Inc., Mountain Lakes, N.J., a firm specializing in minicomputer and microprocessor turnkey software. He is also chairman of MiniData Services, Inc., a service company.

Previously, Highleyman was responsible for Data Phone development at Bell Telephone Laboratories and was a cofounder of Data Trends, Inc. He has been instrumental in the design and implementation of survivable systems for the graphic arts, communications, financial and wagering industries.

Highleyman holds a B.E.E. degree from Rensselaer Polytechnic Institute, an S.M.E.E. degree from Massachusetts Polytechnic Institute and a D.E.E. degree from the Polytechnic Institute of Brooklyn. He holds four patents and has published extensively on pattern recognition, communications and business minicomputers.

LOOPS And Firm Foundations

Fancy loops are not wrong, just unnecessary. Anything a fancy loop can do, a fundamental structure can do better, the author maintains.

By Roger House

"So much, at the primitive level, is commonly overlooked, and what is seen is normally recounted in a fashion so fragmentary as to be hardly coherent. The very act of dwelling for a while with even a simple form can evidently tax the whole of one's powers, so that to leave the simple forms before one is properly familiar with them can result in many unrewarding, or largely unrewarding, . . . excursions."

— G. Spencer-Brown
(from *Laws of Form*)

The data processing industry is in trouble. Millions of dollars and years of effort are spent to create unwieldy systems that are riddled with bugs and don't properly solve the problems they are intended to solve.

Much attention has been focused on why this is so, and one design method after another has been proposed to solve the problem, usually including some new form of diagram or chart with a hyphenated name. Many of these design methods are sound enough. In fact, most of them are based on the same two or three general principles dressed up in different costumes. But even when we use these new methods, we seem to have no difficulty creating bad to mediocre systems.

Why is this? I would like to suggest that one of the main reasons is that we fail to distinguish between what is fundamental and what is not. And even if we see what is fundamental, we apply it incorrectly or not at all. In short, we are in such a hurry to build grandiose, sophisticated products that we neglect the simple basics and end up with castles built on foundations of sand.

This article aims to illustrate this thesis in one area, namely the subject of loops, how they are not understood and the problems that arise from neglecting the basics.

Let's start with an example showing how confusion about basics leads to needless irritation and waste, to say the least. In his recent book, *Structured Systems Development*, published by Yourdon Press, 1977, Kenneth T. Orr is asked about the behavior of a particular program when its input file is empty, that is, contains no records. Orr's reply: " 'I make sure that I don't call this program!' Indeed, unless you simply enjoy watching the operating system grind away, I can't think of any good reason for executing a program with no data."

I find this to be a very peculiar statement. First, the issue is not one of "data" versus "no data." A file is a data structure, and if a program has a file as input, then it indeed has data to process. It may happen that the input file is empty, just as a numeric data item may have a value of zero. We don't say that a zero data item is "no data," and likewise we shouldn't say that an empty input file is "no data." Most likely, Orr meant to say, "I can't think of any good reason for executing a program with an empty input file."

But this statement is also troublesome. Continuing the analogy with zero data items, we conclude that it is a waste of CPU time to compute A + B if either operand happens to be zero. The problem is that determining whether A or B is zero and, if so, not adding them is more bothersome and expensive than simply computing A + B no matter what values they contain. I suggest that the same holds true for processing empty input files.

Practical Illustration

Here is a very down-to-earth, practical illustration of this. Say we have a system in which Program A is run periodically to check a master file for certain exceptions (see Figure 1). For each master file record that qualifies as an exception, some data is written to an Extract File E. After Program A terminates, Program B is run to process File E and print Report R for Jones, who takes care of the exceptions. Now, on rare occasions, Program A finds no exceptions, so File E is empty. Using Orr's suggestion, we should not run Program B because its input file is empty.

You may have some questions at this point concerning who or what determines that E is empty, how this information is used to make sure B is not run since in the normal course of events B will be run and so forth. I leave these questions unanswered because they are second-order problems that will vanish as soon as we get rid of the underlying problem. To go on, let's continue playing out this scenario so that we see the real-life effects of not handling empty files.

When Jones arrives at work on Monday mornings, the first thing he does is take care of Report R, because the exceptions it lists are critical to the company's cash flow. One Monday morning, Report R is not on Jones' desk because File E was empty, and so Program B was not run, no Report R was printed and, of course, it was not distributed to Jones.

Well, Jones is very happy because he doesn't have to worry about his usual Monday morning headache of handling exceptions, right? Wrong! Jones immediately calls operations to find out why Report R is missing. Operations pleads innocent, but begins a search. Meanwhile, Jones' supervisor is on his back because information from Report R is needed for the weekly production meeting. Need I go on?

Now, let's consider a second scenario, one resulting from observing a different rule: A program will always process an empty input file in an appropriate manner (which generally means an empty input file is processed just as one that is not empty). Jones arrives one Monday morning and finds Report R on his desk. This Monday, Report R is "empty"; it consists of one page with titles, no detail lines and a summary indicating zero exceptions found. Jones smiles, files the report and phones his supervisor to let her know there are no exceptions to handle in the weekly production meeting. Of which scenario would you rather be a part?

What led to Orr's statement about empty files? My guess is that this

(Continued on In Depth/20)

IN DEPTH

Figure 1. An Exceptions Report

IN DEPTH

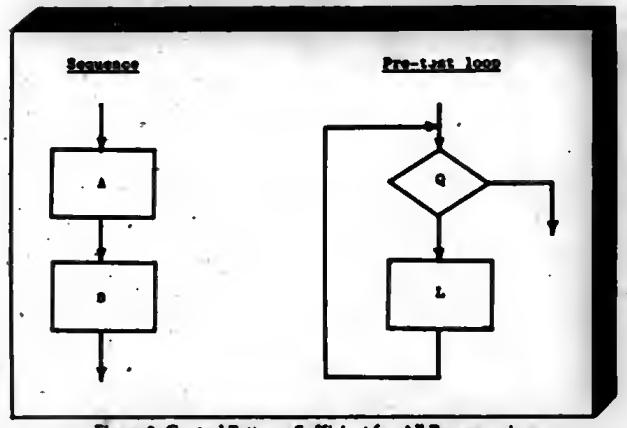


Figure 2. Control Patterns Sufficient for All Programming

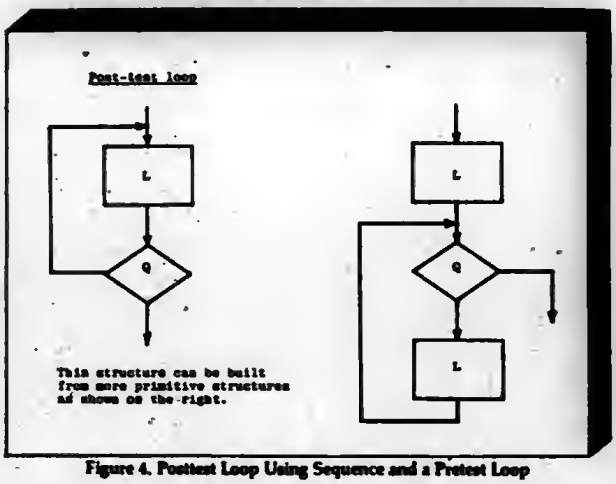


Figure 4. Posttest Loop Using Sequence and a Pretest Loop

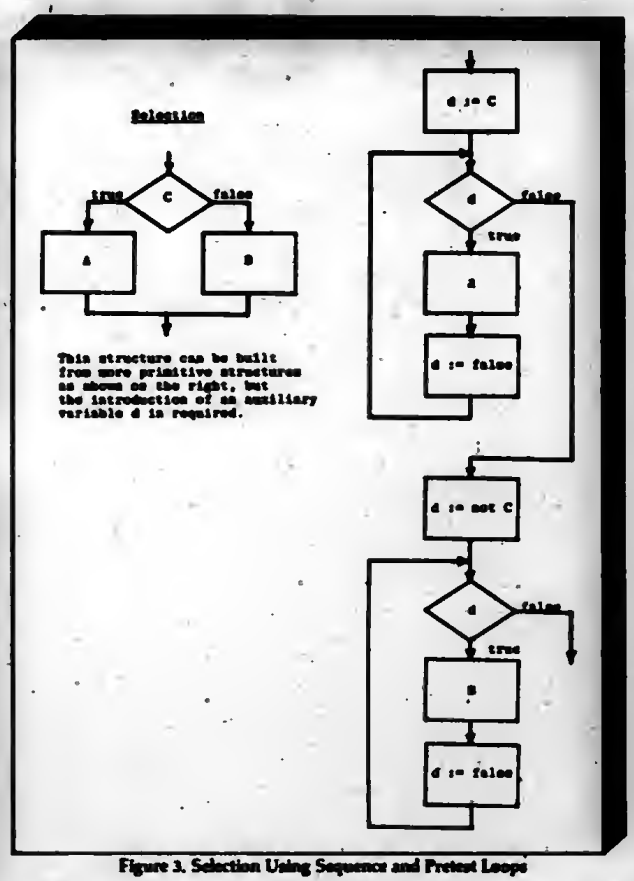


Figure 3. Selection Using Sequence and Pretest Loops

(Continued from In Depth/19)

statement is a result of confusion about basic loop structures. We will return to this after discussing loops.

Fundamental Role of Loops

The ability to execute loops is the basis of computer programming. Without loops, computers would be little more than toys; they would be useful for very few practical applications. After some thought, any programmer will agree that loops are basic to programming.

However, in 1966, C. Bohm and G. Jacopini; showed that loops play an even deeper and more fundamental role than had previously been suspected ("Flow Diagrams, Turing Machines and Languages With Only Two Formation Rules," *Classics in Software Engineering*, Yourdon Press, 1979). They showed that a particular type of loop, the pretest loop (see Figure 2), along with sequence, are sufficient to do *all* programming whatsoever. (Of course, we should rigorously define what we mean by "programming" before making such a statement, but for our purposes it suffices to say that "programming" covers any code we might write in Algol, Basic, Cobol, Fortran, Pascal, PL/I, and so forth.) Since structured programming has been the burning issue of the day for some time now, most programmers have at least a vague idea that a limited number of control patterns suffice to do all programming. However, very few seem to appreciate how really astonishing it is that the almost trivial structures of sequence and pretest loop are powerful enough to implement *any* function we have coded over the last 20 years or so.

Sufficient Not Always Enough

In the realm of hardware, it is well known that a single Boolean function is sufficient for implementing all other Boolean functions such as AND, OR, NOT and so on. However, for many reasons, it turns out to be more practical and convenient to use AND, OR and NOT as primitives in the design of circuits, instead of one single basic function. Likewise, when it comes to programming, it is very convenient to add at least one more structure to the basics, namely selection.

However, don't be misled. Selection is *not* a basic structure. Anything that can be done using selection can also be done without it because selection can be implemented using sequence and pretest loops as shown in Figure 3. Examination of Figure 3 shows why we want selection as one of our building blocks; it is simply too awkward to implement selection using sequence and pretest looping. Since selection is a very common structure in programming, we add it to our set of control patterns.

Another situation occurs now and then in programming, namely the need to perform a loop which has a test at the end instead of the beginning. Such loops are called posttest loops and, again, we don't need them because they can always be implemented by using sequence and a pretest loop as shown in Figure 4. However, as for selection, we may want to add posttest loops to our repertoire of control patterns, simply for convenience.

Messing Up Something Simple

So far we have been looking at control structures represented as flowcharts. Ultimately, however, we are interested in writing source code using the control structures, and so we need some sort of syntax for expressing them. Traditionally pretest loops have been represented along the lines of:

```
while Q do
  L
endwhile
```

and posttest loops have been represented as:

```
repeat
  L
until Q
```

There are currently no universally followed standards for representing control structures in pseudocode, and thus some conventions use do while Q instead of whileQ do, but the control structure is the same even though it may be represented in different ways.

Unfortunately, the issue of the syntax of pretest loops and posttest loops has led to a really embarrassing situation; there is a widespread assumption that while implies pretest and until implies posttest. If you gain nothing else from this article, please remember one thing: The use of while or until in a loop has absolutely nothing whatsoever to do with whether the loop is a pretest loop or a posttest loop. The use of while indicates that the loop should be executed as long as some logical expression has the value true. The use of until indicates that the loop should be executed as long as some logical expression has the value false. See Figure 5.

Of course, we can get by with using only while or only until. For example, until Q do can always be written as while not Q do. However, it is clearer and less confusing to think of until

LOOPS AND FIRM FOUNDATIONS

IN DEPTH

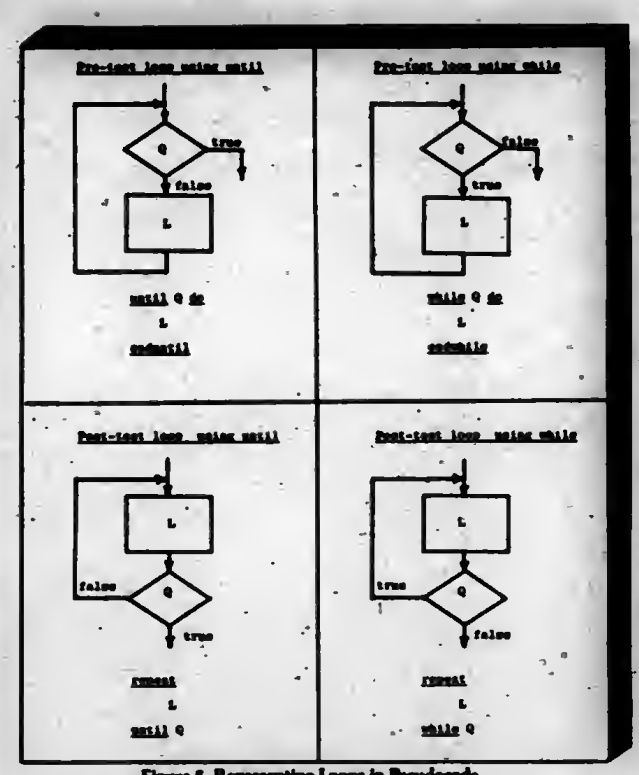


Figure 5. Representing Loops in Pseudocode

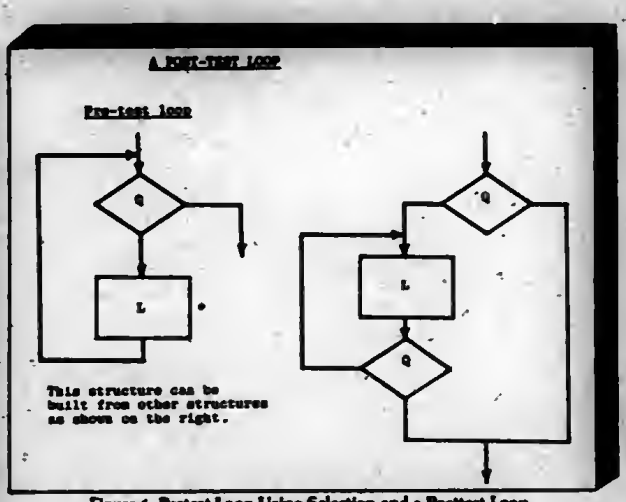


Figure 6. Pretest Loop Using Selection and a Posttest Loop

end of file do rather than while not end of file do, so why not furnish the programmer with both while and until so that the intended logic can be expressed as naturally as possible? Figure 5 shows both pretest and posttest loops, each using both while and until.

There are two issues here, the first being what logical value to use to terminate a loop (while or until) and the second being where to place the loop test (pretest or posttest). These two issues are quite separate; they have nothing to do with one another. So how has it happened that they have become confused? I don't know the answer to this question, so I can only speculate. One possible source of the confusion might be that Pascal uses while for pretest loops and until for posttest loops. As the use of Pascal has spread, the association of while with pretest and until with posttest may have become fixed in people's minds.

However, this still does not answer the question, it just raises another one: Why would the association arise in people's minds? Perhaps the answer is that we humans seem to have a deep-seated predilection for avoiding simple, straightforward thinking. We will design a new programming language before spending 10 minutes contemplating a simple but fundamental principle in a common-sense fashion.

There are nasty consequences of this failure to deal with basics. Following is an example of the needless confusion and chaos that result from sloppy thinking which lumps two independent issues together.

Mutilating a Language

Standard PL/I has long contained the following construct:

```
DO WHILE (Q);
  L
END;
```

This is precisely the pretest loop using while, and it is to the credit of those who designed PL/I that they included this fundamental construct in the language. Recently some versions of PL/I were extended by adding a statement of the following form:

```
DO UNTIL (Q);
  L
END;
```

Obviously, this is the pretest loop using until. Obviously? Well, it *should* be the pretest loop using until, but, in fact, it represents the posttest loop using until.

The new addition to PL/I breaks a fundamental rule of design: Form should follow function. In the area of programming languages, this rule might be formulated as, "Syntax should reflect semantics." In other words, the form of a statement, its syntax, should reflect the meaning of the statement, its semantics. The DO WHILE and DO UNTIL statements described above have similar form, and anyone with a modicum of ordinary common sense will assume that they have similar meaning. If DO WHILE is a pretest loop, then clearly DO UNTIL should also be a pretest loop. That DO UNTIL is a posttest loop will simply lead to misunderstandings, bugs in programs, wasted dollars and perhaps even property destruction and loss of life.

Every new crop of trainees learning PL/I will be drilled on these two loops over and over again to pound their common sense assumptions out of them. Most of the trainees will assume there is some good reason the two loops look alike but behave differently; after all, computers and programming are so complicated that the trainee only hopes to understand someday the subtle reasoning behind things.

Anyone teaching these loops will do the trainees a great service by explaining to them that the similarity of form and difference in meaning are simply the result of muddled, half-baked thinking. Better yet, do *not* teach this mess to anyone. Teach DO WHILE and never mention DO UNTIL.

In the foregoing discussion I am not railing against the use of posttest loops, but against confusing ways of representing them. A posttest loop, as the name implies, results in evaluating a logical expression at the end of a loop, and thus reason dictates that the syntax place the test at the end of the loop. (By the way, when the test is written at the end of the loop, it is also easier for compilers to handle the construct.)

If you feel that the new DO UNTIL statement in PL/I may be a bit awkward, but can be lived with, consider how to add the pretest until loop and the posttest while loop to PL/I (see Figure 5).

Back to Empty Files

Now it's time to go back to the question of what led to Orr's statement about processing empty files. Of course I am speculating, but I think this statement came directly out of Orr's choice of basic control structures. Orr chose the posttest until loop as the means for achieving repetition and, as a result, a program that handles empty files requires an explicit test to check if the file is empty. In effect, a pretest loop is implemented using selection and a posttest loop (see Figure 6). Implementing pretest loops in this way is a bit awkward and clumsy, so it is nice to know that the input file always contains at least one record so that the test for an empty file can be omitted. Ergo, Orr's statement.

If Orr had chosen the pretest loop as the means for achieving repetition, he would never have had any reason for making his statement and, in addition, he could have omitted six or seven pages of dubious argument from his book. So, why didn't Orr choose the pretest loop? Possibly because when he made his choice he didn't stop to consider which loop is more fundamental. Using sequence and pretest loops, we can construct selection and posttest loops. However, we cannot construct selection and pretest loops from sequence and posttest loops. Thus, pretest is more fundamental than posttest and clearly should be in our set of basic control structures. Of course, there is no reason we shouldn't have *both* pretest and posttest loops in our repertoire, but if we only choose one, let it be the most basic loop.

The lesson is that some thought about fundamentals can save us a lot of needless confusion, awkwardness and bother.

Fancy Loops

Designers of programming languages seem to vie with one another to see who can come up with the fanciest loop structures; for an example, study all the options and defaults available in the DO loop of PL/I. There is nothing inherently wrong with fancy loops, as long as we realize that the fancy loops are unnecessary in that they can be implemented with the fundamental structures.

For example, consider this Fortran DO loop:

```
Do 99 I = 1,10,2
loop body
99 CONTINUE
```

(Continued on In Depth/23)

WHAT SPERRY UNIVAC IS DOING IN THE MINICOMPUTER BUSINESS.

PUTTIN

OUR BROAD MINDED PLANS

YOU'RE NEVER FAR FROM SERVICE

SPERRY UNIVAC

LOOPS AND FIRM FOUNDATIONS

IN DEPTH

(Continued from In Depth/21)

Using the pretest until loop, the same effect is achieved by:

```
I = 1
UNTIL I  15 DO
loop body
I = I + 2
ENDUNTIL
```

This is not to advocate that we do away with fancy loops like DO (or PERFORM VARYING) which implicitly initialize, increment and test variables. Such loops are useful in that they succinctly represent commonly occurring sequences of operations, and they can often be compiled into very small chunks of object code which run very fast. However, let's be sure to have the basics in our languages, *to define the fancy stuff in terms of the basics* and to know the difference between what is basic and what is not basic but is built up from basics.

This latter point is crucial. When the basics are not provided in the language, we are hamstrung, attempting to build cathedrals with the latest in advanced technological tools but no mortar. The next section describes a case of missing mortar.

'When Will We Ever Learn'

Recently a new standard for Fortran was adopted, informally known as Fortran 77 (see *Communications of the Association for Computing Machinery*, Volume 21, No. 10, October 1978). Since the ideas of structured programming and control structures have been widely discussed and publicized for nearly a decade, one would assume that the new Fortran would incorporate some of these ideas. Indeed, the standards committee did add the general selection construct (IF-THEN-ELSE) to Fortran, only some 20 years after the birth of the language.

Unfortunately, and almost beyond belief, Fortran 77 does not contain the basic, fundamental loop structure. There is a loop structure, of course, a cleaned up, more useful version of the DO loop. But what if I want to write the Fortran 77 equivalent of:

```
while Q do
L
endwhile
```

Too bad. There is no loop in Fortran 77 that terminates when a logical expression becomes true or false. Of course, by using GOTO or by twisting and turning the DO loop in an unnatural and undesirable way, it is possible to implement pre- and posttest loops. But this is true of Fortran 66, the old original Fortran of the 1950's, as well as the most primitive Basic.

When you think about the work, the effort and the time that goes into standardization, it is very sad that one of the two basic structures of programming is omitted from the language. Reason: Failure to look at what is fundamental and a failure to recognize that the pretest loop is basic, that it is possible to build any kind of fancy loop from the basics, but not vice versa. We need to understand the difference between what is fundamental and what is simply a collection of frills tacked on to the fundamentals!

Good Tools Not Enough

Of course, simply having the basics available is not a guarantee that everything will then proceed as if on greased wheels. A casual look at many so-called "structured" programs reveals that good tools can be used to write poor code. Here is a typical example of the logic used to process a sequential file as found in many articles and books purporting to show the reader how to write structured code:

```
MOVE FALSE TO EOF-FLAG.
PERFORM RECORD-LOOP UNTIL
EOF.
```

(Continued on In Depth/24)

EDP

DISASTER PLAN

METHODOLOGY

Gives you what you need to implement, maintain & test a Disaster Plan — tasks, procedures and guidelines.

Learn how to develop a disaster recovery plan at our 3 day workshops:

Wash. D.C. Mar. 24-26, 1980
Orlando, FL April 14-16, 1980
Boston May 19-21, 1980
San Fran June 11-13, 1980

EDP Security, Inc.
400-2 Totten Pond Rd.
Waltham, MA 02154
617-890-6466

Could be—unless you keep up with this ever-changing market with our March 31st Special Report, Data Communications Terminals. Like Computerworld readers, data communications terminals are becoming even more intelligent. This means a wider range of functions and greater flexibility of applications for the end-user—large and small. It all adds up to less cost—or does it?

Edited by Brad Schultz, this Computerworld special report will feature tutorial essays, accounts of user experiences, reviews of current products and speculations about the future. It will also address questions like:

- **What's the trade-off between smartness and dumbness in terminals?**
- **What DP environments are best suited for the more intelligent hardware?**
- **What should buyers look for in terminals?**
- **How are they best implemented?**

If staying abreast of this rapidly changing field is a part of your job, you shouldn't miss our March 31st Special Report.

And if you're a manufacturer or marketer of Data Communications terminals or systems, your ad here will reach a large and interested group of readers. Ad close is March 14th. Call your Computerworld representative for all the details. Or, to reserve space for your ad, call Frank Collins at (617) 879-0700.

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Boston	Chicago	New York	San Francisco	Los Angeles
Bob Ziegel	Tom Knorr, Jr.	Don Fagan	Bill Healey	Jim Richardson
Chris Lee	Bob Ziegel	Mike Eisenkraft	Barry Milione	Bob Hubbard
Ed Marecki	Jane Wrightman	Peter Senft	Ruth Gordon	Kathie Knox
Kathy Doyle		Candy Kelly		
(617) 879-0700	(312) 782-7565	(201) 461-2575	(415) 421-7330	(213) 450-7181

IN DEPTH

(Continued from In Depth/23)

```
RECORD—LOOP.
  READ FILE-A AT END
    MOVE TRUE TO EOF-FLAG.
  IF NOT EOF THEN
    process record.
```

This is structured; it uses a pretest loop; isn't it a sterling example of good code? No. It is clumsy and awkward. In addition, it violates a good programming practice which has been in use since long before "structured" became a hot item, namely the READ of a file should be isolated in a module so that there is only one READ statement per input file. Why? Simply because at some point it will be necessary to count the input records, sequence check them or something or other, which will be much easier to do if there is only one place in the program where the file is read.

So the first step in cleaning up the code is to define a module to read records:

```
READ-FILE-A.
  READ FILE-A AT END
    MOVE TRUE TO EOF-FLAG.
```

The next step is to clean up the loop:

```
  MOVE FALSE TO EOF-FLAG.
  PERFORM READ-FILE-A.
  PERFORM RECORD-LOOP UNTIL EOF.
  . . .
RECORD—LOOP.
  process record.
  PERFORM READ-FILE-A.
```

This logic reads the file to get the first record (if any) and then enters the loop. We will, in fact, only enter the loop if we have a record to process, in which case we process it, and then, as the last action in the loop body, we read the next record (if any), loop back and process the next record and so on. When the logic is arranged so that the loop is only entered when there is a record to process, life is much simpler. The action of the loop body is, "Process the current record and then read the next record."

Note that if the input file happens to be empty, the code functions properly. We need no special tests to see if the file is empty, no special cases or special code. This is as it should be. A good, general solution handles so-called "special cases" automatically as part of the general case.

Considering the examples we've seen, is it any wonder we are beginning to see articles with titles like "Has the Structured Revolution Failed"? If we really get down to the root of our problems, we might start seeing headlines like "Failure to Apply Fundamentals: A Problem in DP Industry?" My aim has been to suggest that a modest understanding of theory, a knowledge of what control structures are and which ones are fundamental and a modicum — just a milligram — of thought can save us much unnecessary confusion and expense.

Acknowledgements: I would like to thank William Elbring and Gerald Weinberg for many useful comments on an earlier version of this article.

See How It All Connects

Come to the first Office Automation Conference

World Congress Center, Atlanta, Ga. March 3-5

Little by little, bit by bit, almost without anyone realizing it, a multi-billion dollar industry has been born.

It is the office automation industry, and it portends enormous change in the way business offices operate and office products are marketed.

That's why AFIPS has created the first Office Automation Conference. A chance to see all of today's worksaving devices and how they relate. A chance to discuss your role and that of co-workers in the automated office of the eighties.

Over 100 companies will be exhibiting at this first-of-its-kind conference. You'll see the very latest in word processors, optical readers, text editing equipment, memory filing systems, automated typewriters, business computer systems, voice technology and telecommunications-to mention just a few.

Your registration fee also covers over 50 learning sessions on topics such as What is Office Automation?...Why Automate?... Integration of Data and Word Processing...Optical Character Recognition...Teleconferencing...Case Studies in Office Automation Work.

Be an exhibitor, be a participant in the world's first all-inclusive Office Automation Conference. For more information, send the coupon below.

TO: Office Automation Conference
c/o AFIPS, 1815 N. Lynn St.
Arlington, VA 22209

CW

☐ Send me housing and registration information.
☐ My company is interested in exhibiting. Please send information.

NAME _____
STREET _____
CITY _____
STATE _____ ZIP _____

Roger House began his career in 1963, working in Copenhagen on a Cobol compiler for the Siemens 3003. He has also contributed to the Advanced Research Projects Agency project at the University of California, Berkeley, and built a plaintext-to-Braille translator for KVAL, a Stockholm-based linguistic research group.

As a consultant, House has developed Cobol compilers, RPG interpreters, information retrieval systems, circuit simulation compilers and business systems. For the past six years, he has conducted Brandon Systems Institute's workshops in structured techniques.

It's There — It Just Costs More

Users: Shortage? What Paper Shortage?

By Jay Woodruff
and Ann Dooley
CW Staff

While users are not experiencing problems getting paper supplies — as long as they are willing to pay the price — many are now finding ways to use less paper in their daily operations.

At least that's the conclusion that can be drawn from a recent *Computerworld* survey of users.

None of the 26 users surveyed have failed to meet their DP schedules for lack of paper, although many said they have heard rumors of a shortage. Only two users actually experienced problems getting paper supplies, but respondents generally agreed that it does take longer to get them.

"We've questioned the vendors and they forsee no problem. They have been stocking three months ahead," Herb Robinson, division manager and vice-president of operations at Wester Bankcorp. in Tempe, Ariz., said.

About 30% of users surveyed are using more paper than last year, which may have caused suppliers to lag behind the demand. About 38% are using the same amount of paper as last year, and only one user has actually cut paper consumption.

"The current situation is a seller's market," according to Brent Williams, purchasing agent for the First National Bank of Oregon. "It takes a little longer to get custom forms, and for a large request, the forms people have to special-order.

"There certainly is no shortage of raw materials," he added, a change from last year when West Coast paper strikes threatened supplies [CW, Jan. 15, 1979].

User Strategies

Only two users said they can still get paper in a few days or less, while two more said they generally order a month in advance. Others keep a 90-day supply on hand, while a few users now maintain — either on-site or at vendor premises — a year's supply of paper.

Some users who could get rapid delivery over a year ago now hold one-year supply contracts to guarantee they will get what they need.

Other users admitted they were not aware of any change in ordering policies because their orders are handled by separate purchasing departments — which have not signaled users of trouble in filling their orders.

Of the two firms that reported encountering serious problems getting paper, one is still having a lot of trouble, and the second now worries only occasionally about spot shortages.

A Fort Worth, Texas-based firm that asked not to be identified has had a "heck of a battle" getting paper forms supplies, a spokesman said. He expressed hope that the situa-

(Continued on Page 52)

System at Metropolitan Life Handles 50,000 Claims Daily

UTICA, N.Y. — An on-line insurance claims system serving 300,000 employees has reportedly quickened turnaround, lowered costs, reduced paperwork and added claims-processing flexibility here at Metropolitan Life Insurance Co.

Designed to process 50,000 claims a day when fully implemented, Metropolitan's Unified Claims System is presently operational for vision care alone under the firm's Medimet plan. It has been handling employees from the aluminum, automobile, can, coal, steel industries who are covered for eye examination, frame and lens charges. The current volume of the system, which started up in early 1979, is about 8,500 claims a week.

Based on an IBM 370/168 and 3033 mainframe in Greenville, S.C., to which IBM 3270 CRT terminals are linked over telephone lines, the system provides three major on-line, real-time capabilities: data entry of claims, file update and inquiry.

Data on employee eligibility, provider verification and charges, as well as patient history and reasonable or customary fees, is stored in the computers' master files, accessible by the 3270s. The Unified Claims System also has a plan master file, a preprogrammed plan design with specifics to "tailor" the system to a particular group, according to Project Manager Ajay Mithal.

"It drives the whole system, helping us customize without reprogramming," Mithal said. "If a customer wants the company address printed on the benefits statement sent to the employees, for example, that data is stored on the plan master file."

Claims processing in Utica starts with incoming mail — claims forms and attachments sent by providers (such as ophthalmologists, optometrists and opticians), employers and employees. Each case is microfilmed and assigned a unique identifying control number: a worksheet is then prepared. Cases then move to a 3270 data entry

(Continued on Page 52)

Miniconference, Seminar Set For Data Entry Professionals

STAMFORD, Conn. — A miniconference and seminar on "The Improvement of Data Entry Productivity and Distributed Data Entry" have been scheduled for Palm Springs, Calif., on April 15-17 and New York City on June 2-4 by the Data Entry Management Association (Dema).

The day-and-a-half miniconference in both locations will feature speakers and workshops designed to help data entry professionals improve management skills, keep pace with technology, increase productivity and reduce costs.

Attendees can choose one of two day-and-a-half seminars on "How to Improve Data Entry Productivity" or "Distributed Data Entry/The Automated Office."

Attendees can register for both the miniconference and a seminar (three days) or either one. The fee for the miniconference is $195; by paying that fee, attendees can automatically join Dema. The seminar fee is $250.

Dema can be reached at P.O. Box 3231, Stamford, Conn. 06905.

You Asked For It!!

DEC
LEAR
SIEGLER
TI
DIABLO
TELETYPE
VADIC
AJ

When Continental Resources established the Peripherals Division, we listened closely to all our customers. And, we still do.

Instant delivery, prompt service with application assistance, the top brands in the business and, of course, low cost sales. That's what you told us you needed, so that's what we offer.

Continental also offers an automatic 90-day warranty, on-site service options and budget rental and lease plans.

So call Continental Resources. We'll listen!

CONTINENTAL RESOURCES, INC.
175 Middlesex Turnpike • Bedford, MA 01730 • (617) 275-0850

Boston: (617) 275-0850/ N.J.: (201) 654-6900 (609) 234-5100/ N.Y.: (212) 695-3206/ Philadelphia: (215) 625-0983/ Washington D.C.: (301) 948-4310/ Southeast: (800) 327-3444/ Chicago: (312) 860-5991/ Midwest & South Central: (800) 323-2401/ San Francisco: (408) 727-9870/ Los Angeles: (213) 638-0454

On-Line System Handles 50,000 Claims Daily

(Continued from Page 51)
station for, keyboarding of group, employee number and basic claim data.

From this point, the claim is completely monitored by the Unified Claims System at each stage of processing, Mithal explained. In addition to checking the eligibility of the claimant and provisions of the contract for a particular group, it makes sure the service was performed by an eligible provider.

The system also checks for duplicate bills and limitations on benefits, matches charges against reasonable and customary amounts and calculates the benefits to be paid.

"The system highlights variations from the norm," Charles Lanigan, vice-president of group insurance marketing, observed. "Let's say a provider who usually charges $17 for an exam sends in a charge of $25 for the service. The computer will immediately spot this change and a correction will be made before the provider is paid."

If the claim meets all criteria at data entry as far as needed information and requirements go, it is processed by the computer. At any time, however, the data entry operator can change the original input or suspend the claim for later action.

For example, a claimant may appear not to be covered because the latest eligibility information has not been entered in the data base. After updating the data base the operator can recall the suspended claim for processing.

Thanks to the "suspend" file, no claim is ever lost. "Once entered into the suspend file, the claim can be reviewed at any time. Anyone can inquire into outstanding claims and learn how old they are," according to John Falzon, vice-president of group corporate staff.

Once a claim is processed — either closed out and paid or delayed for futher information from the policyholder — it goes to nightly batch processing.

The computer puts out an explanation of benefits for the employer and employee, writes checks for the provider or employee, generates any letters needed to request more information from the policyholder and provides an abstract for Metropolitan.

Participating providers get bulk payments, normally twice a month, with a single check covering all claims for the period and a summary statement of each claim showing the amounts charged, covered expenses and benefits payable.

Payments in One Week

The Unified Claims System goes through the entire cycle for a claim in about three fewer days than the system previously used. "We pay 95% of the claims within a week with much greater accuracy and control," Mithal said.

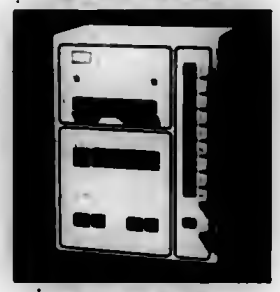
One of the major benefits of the system, according to Mithal, is that "the system is flexible enough to add almost any kind of group and plan provision on short notice."

The network will soon be extended to include the entire Metropolitan system of claims, regional and corporate offices. When dental coverage is added, 600 CRT terminals will be on-line to the system.

Within one to two years, the system will be complete for vision care, dental and medical coverage, with 1,000 CRT terminals in a nationwide network.

Smart Clock

The Leader in Stand Alone Data Collection Terminals



Data Collection For . . .

- PAYROLL
- INVENTORY
- JOB COSTING
- SECURITY ACCESS

AND OTHER CUSTOM APPLICATIONS

coastal data products inc

1502 N.W. 159 Street, Miami, Fla. 33169

Telephone (305) 625-7123

Users Finding Ways To Conserve Paper

(Continued from Page 51)
tion would be temporary.

Nevertheless, he conceded that while paper was hard to get for six or eight months, "we never ran out."

Rohr Industries, Inc. is an aerospace subcontractor that began to feel a paper pinch last July, according to its general supervisor of data center control, Jim Pere. "We used to get a couple of days' turnover on our forms orders, but now we maintain a 30-day emergency supply," he said.

The Rohr DP shop and others indicated it frequently found it necessary to contact a number of vendors in order to fill its orders for continuous forms.

Cutting Consumption

Users on the whole are taking steps to cut their paper consumption — not for fear that paper will be hard to get, but because they worry about paper's steady climb up the price ladder.

Nearly all of those who said their paper use has not increased directly attributed that accomplishment to their substitution of computer output microfilm (COM) and other paper-reducing aids.

The survey found COM by far the most popular means of cutting paper use, with 42% of the 26 respondents using it. Some of those who registered an increase in paper use said the increase would be even larger without COM.

To cut consumption, three other users increased their use of interactive programming. Three more tried carbonless forms to save the cost of carbon sheets, but dropped them after a short time because they found them unsatisfactory.

Among other paper-saving "tricks" cited by respondents were printing on both sides of the paper, mostly for dumps and developmental programming, increasing communications over CRT terminals and printing 8 line/in. instead of 6 line/in.

IBM and Xerox Corp. laser printers, especially those that print on two sides and print forms simultaneously with reports, have been purchased or considered by a number of users. One user has tried using lower grade paper for printing reports.

Microfiche Strategy

James Lake, senior vice-president of First International Bank in Dallas, mirrored other user comments when he said that "microfiche is part of our strategy. Five years ago, we went to it to provide a cost improvement to our organization. We're looking into compressed printing for the mid-year."

Another company that preferred its name not be used started making changes the last time it was hit by a paper shortage. "We went to 8 line/in. Every year, we sent out questionnaires to our users to review the way they do their reports," a spokesman said.

If some reports can be dropped, he said, the firm saves paper. The company is putting more data on microfiche, especially for large reference reports.

Many more users said they are evaluating the same measures and may include them to cut costs in the future.

In spite of the fact that paper costs continue to rise, 30% of the survey audience made no change whatsoever to reduce its paper consumption.

One user said that as long as his clients ordered DP tasks to be done, he would comply and charge them accordingly as prices rose. Another said that the "nature of my business" precluded any change in the way his operation consumed paper.

Low Cost Card Punch and Card Reader for DEC HP DG IBM Computers

The CCC 1700A Keypunch Interface can connect your computer, time-share terminal, or any bit serial communicating device to an IBM 129 or 029 Keypunch so it will both punch and read data cards! It's EIA compatible, converts ASCII or any bit serial code to Hollerith when punching, converts Hollerith to ASCII or any bit serial code when reading, and permits the efficient transfer of data through a 900 character buffer. The 1700A operates at all standard baud rates from 110 to 9600. And it requires no special software drivers, standard Basic or Fortran "PRINT" or "WRITE" statements work just fine!

CCC

COMMUNITY COMPUTER CORPORATION

166 West School House Lane • Philadelphia, PA 19144 • (215) VI 9-1289

Drives Speed Steel Maker's Throughput 400%

KANSAS CITY, Mo. — At Kansas City Works, a division of Armco Inc. here, disk and tape drives are being used to store the thousands of order and production data items related to the various steel products that move through the plant en route to the customer.

In addition, the equipment is reducing the time and expense of storing and processing this data, thus contributing to responsive sales service, balanced production resources and appropriate inventory levels, the firm said.

Production data is entered through a CRT terminal into the disk files.

"The Memorex Corp. disk and tape drives are providing a cost-effective solution to our data storage needs," according to Thomas H. Gray, supervising systems engineer for operations and technical support.

"We needed reliable storage equipment that was compatible with our IBM 370/158 mainframe. The Memorex 3670 and 3650 disk-storage modules give us an excellent cost/-performance ratio. And the 3226 dual-density tape drives are four times faster than our previous drives, speeding up our tape processing throughput significantly."

Kansas City Works, often referred to as a "supermarket of the steel industry," is basically a "bar" mill, fabricating items from the bars and rods it produces.

In addition to nuts, bolts, and nails of all sizes,Kansas City Works also fabricates joists, merchant bars, wire rope and strand, welded wire mesh, wire fence, reinforcing bars, track spikes and grinding balls. Total plant capacity is one million tons a year.

The plant's computer system handles a wide variety of batch and on-line applications. Batch applications include payroll, labor distribution and manufacturing control. On-line applications include sales-order control, production reporting and shipping and inventory control.

The system is currently up five days weekly, and three shifts daily. In addition, on-line data collection without an operator is up on the weekend.

The system mainframe is an IBM 370/158 running under OS/VS-1 and IMS. It is configured with approximately 70 CRTs and remote printers, two 1100 line/min printers, a card reader and card punch and a programmable communications controller.

Disk equipment includes four spindles of Memorex 3670s, six spindles of 3650s and a Memorex 3653 controller. For tape, the company uses four Memorex 3226 magnetic tape units.

"We installed the Memorex equipment in two phases during September and October 1978," Gray said.

The 3650 direct access storage subsystems, which provide 200M bytes per drive in compatability mode and 317.5M bytes in native mode, have an average access time of 25M sec. The 3670 direct access storage subsystems, which provide 100M bytes per drive, have an average access time of 27M sec.

The 3226 dual-density tape units operate at 1,600 and 6,250 bit/in., with a data transfer rate of 200K and 781K bit/sec. Each unit contains a Tape Maintenance Monitor, which helps identify reels with error rates that warrant transferring data to another reel.

Backup Support

These tape units are currently used by the plant for backup as well as for the batch payroll, labor distribution and accounting systems.

"One of the reasons we installed the tape drives," Gray said, "is that our backups were simply taking too long. Our Sysres backup, for instance, took 90 minutes. With the new drives it only takes about half that time.

"Another reason we got the drives is that they cut down on the amount of tape needed. All IMS transactions, for example, are logged on tape. Previously, these transactions took in excess of one tape a day. Today we rarely need more than one tape, which means a saving in tape-changing time and a resulting increase in uptime for our IMS terminal users."

Kansas City Works has recently been getting more heavily involved in on-line applications. Approximately 70 terminals are used on the production floor to track work in process, in sales for order entry and in shipping and inventory.

Because Kansas City Works is composed of a number of different mills, each with different processing requirements, Armco has taken a customized approach to system development.

"Our mills have such different kinds of products and processing needs that to write a single production control system, for instance, would be nearly impossible," Gray noted. "In any case, the system would be much too large, cumbersome and inefficient."

Bolts and Nuts

In the bolt and nut operation, as an example, there are more than 10,000 types and sizes of products. When a customer or salesman places an order for any of these products, either through the mail or over the telephone, order entry personnel use a CRT terminal linked to the disk files to ensure that the part number is a valid one. After the number is verified, the order is entered into the IMS data base, where it stays during the day for reference. Price information from product catalogues is also entered.

If the product ordered is already in stock, the system reduces inventory by that quantity so the same item will not be sold twice. The product is then released to the shipping floor.

If the product is not in stock, a master "tag" for each production step involved in producing the item is printed. The tags are clipped on the sides of large metal cans containing the order as it moves through production.

To Cut Response Time Sixfold

Disk System Maker Expands Field Maintenance

By Jeffry Beeler
CW West Coast Bureau

SUNNYVALE, Calif. — System Industries, Inc. is expanding its field maintenance plan in six key U.S. cities in an attempt to cut its service-call response time sixfold.

Under the optional plan, System Industries guarantees it will respond in four hours or less to any customer service call originating within a 50-mile radius of New York City, Boston, Cincinnati, Chicago, Los Angeles and San Francisco.

The service plan is also being offered to the disk and tape system manufacturer's customers in London, according to Richard Milligan, the company's vice-president of customer and corporate services.

System Industries' "key-cities service program" reportedly represents an improvement over the firm's previous maintenance agreements, which guaranteed only a 24-hour response time to customer calls.

Users most likely to benefit from the company's latest service plan will include banks, insurance underwriters, accounting firms and other customers of System Industries' Model 9400 disk unit, which was introduced two years ago to operate with Digital Equipment Corp.'s VAX-11/780 and PDP-11/70 systems.

Service Staff Increased

The sixfold cut in System Industries' response time was made possible last quarter by a 25% boost in the firm's nationwide field-service effort, Milligan explained.

In New York City, for example, the firm increased its service staff from four to five members; in Boston, from one to two; in Cincinnati, from one to three; and in Chicago, from zero to two. In San Francisco and Los Angeles, the size of the company's service staffs remained unchanged, with three and four members, respectively.

Further enhancements to the company's field-service effort will be announced later this quarter, Milligan said.

To supplement its key-cities maintenance plan, System Industries has also provided its customers with a 24-hour answering service. The company guarantees it will answer all calls to the service within an hour and a half, Milligan added.

Choice of Coverage

As with System Industries' other service plans, the key-cities program provides customers with a choice of an 8-, 12-, 16- or 24-hour "service window." (Milligan defines a service window as the portion of each business day during which the terms of a user's maintenance contract are in effect.)

If a customer summons a field-service engineer after its daily service window expires, System Industries will still respond to the call within four hours, if the user agrees to pay an additional fee.

The cost of System Industries' key-cities plan varies with the length of a customer's service window and the type of disk or tape equipment it operates. For an 8-hour window and a 300M-byte disk system, for example, the program costs $2,480/yr.

More information about the key-cities service plan is available from System Industries, 525 Oakmead Parkway, Sunnyvale, Calif. 94086.

'Once Upon a Time There Was a Little System Born of Grateful and Kindly Analysts

"If the auto industry had done what the computer industry has done in the last 30 years, a Rolls-Royce would cost $2.50 and get 2,000,000 miles per gallon."

Bank Controls Static, Grounds Teller Problems

LOS ANGELES — California Federal Savings and Loan Association here recently solved a DP problem by taking measures to control static electricity, which was causing computerized teller stations to malfunction at many different locations.

California Federal is the largest federally chartered savings and loan association in the U.S., with assets of over $6 billion. Cal Fed serves more than 750,000 customers through more than 85 offices throughout the state.

This institution pioneered the use of off-hour manned remote service units in grocery stores and supermarkets and has introduced other various customer services. Branches are located as far north as San Rafael and as far south as San Diego.

James K. Anderson, senior vice-president and head of the management information services (MIS) division, said California Federal's static problems began when a network of upgraded teller stations was installed.

New minicomputer-controlled teller machines were incorporated into the institution's on-line DP system several years ago. About 300 separate teller machines are connected to the central system in Los Angeles by phone line.

When the teller machines were installed, California Federal began to have a number of apparently unrelated terminal problems such as random arithmetic errors, lost transactions and teller station breakdowns, which they could not attribute to any one cause.

Virtually every phase of the MIS division joined in the search for a solution to these problems, including California Federal's electronic technicians, programmers and various vendor representatives, Anderson said.

Static Suspected

The underlying problem became apparent as officials began to hear reports that when an operator walked up to a terminal and touched the keys, a static charge would discharge to the equipment. Static electricity had been suspected as a possible factor in at least some of the problems.

Investigating further, Anderson and his staff learned that a person moving about in dry air, particularly on carpet, can develop static potential in excess of 30,000V — more than enough to wipe out computer information, which is based on several volts or less.

In some cases static discharge can even destroy sensitive electronic components such as microcomputers or solid-state memories. (Static voltage can develop whenever two dissimilar materials make contact and then separate.)

Mats Suggested

A 3M Co. sales representative heard about the static problem during a call to California Federal and suggested to Anderson that 3M's static control conductive floor mats be tried as a possible means to prevent the problem.

The 3M Velostat floor mats were designed for a variety of applications where a worker would be seated at a workstation. These mats are made of a conductive, carbon-loaded plastic and grounded to a wall receptacle by a thin ground cord made of the same material.

"We ordered several of the 3M mats as a test," Anderson recalled, "and the results were obvious and immediate. Teller stations with mats in place suddenly began to perform as designed without the variety of problems we had been experiencing.

"Although we cannot definitely state the exact cause of our initial problems, we can at

(Continued on Page 56)

Computers aren't just an industry, they're a revolution in the way mankind operates. And no one covers this revolution better than we do!

We are CW Communications/Inc. and despite our youth (we'll be 13 this year) we're the world's largest publisher of newspapers and magazines for computer people all over the world.

Most of our publications are weekly newspapers, because so many things happen so rapidly in the computer business (as the headline quote from a prominent industry executive makes so clear).

In only thirty years the industry has gone from the development of the giant Eniac system, through the tube-powered, water-cooled Univac I (the world's first business computer), to the incredibly cheap, battery-powered microprocessor.

But as unbelievable as the last 30 years have been, the next 30 will probably be even more incredible. Right now, IBM has begun delivery of a new computer series that will, by itself, provide four times as much processing power as all the previous computers delivered by the company. And they have announced a new "superconductor" that could improve computer speed and performance by a factor of 500 in the next seven years! It's hard to remember this is real science, not fiction.

This extraordinary increase in efficiency has led to a rapid expansion in computer use, as human ingenuity finds more and more applications for these powerful tools. So the market for computer products and services has turned out to be more elastic than most observers had thought. Worldwide expenditures are currently at $75 Billion, and growing by 20% a year.

A constant flow of new products; rapid changes in technology; more and more new applications; and large and growing expenditures. It's an industry with a strong need for current, complete and accurate information. Which is where we come in.

Our oldest publication is *COMPUTERWORLD*, a weekly newspaper with a growing all-paid circulation in excess of 100,000 (quite an

increase from our modest 7,500 in 1967). *COMPUTERWORLD* serves America's computer users with the consumer-oriented, objective information they need. And it has become America's top business/professional publication, measured by advertising revenue.

Our newest publication is *COMPUTER BUSINESS NEWS*, a weekly newspaper for executives in the U.S. computer industry whose organizations are involved in the manufacture, integration and resale of computer systems. This is a relatively new marketplace which has grown up around the minicomputer and microcomputer, and which shows every sign of very rapid growth for at least the next decade.

The United States alone accounts for nearly half of the worldwide computer market, but billions of dollars are spent by foreign computer people for American-made computers and computer products. And our publications penetrate those marketplaces, too.

We are publishers of newspapers and magazines in the following markets:

Country	World Rank as Computer Market	Publication
Japan	2	*Shukan Computer*
West Germany	3	*Computerwoche*
		Büro (Office of the Future)
United Kingdom	4	*Computer Management*
Australia	9	*Australasian Computerworld*
Brazil	17	*Data News*

In addition, we provide editorial services for, and U.S. advertising sales representation to, the following publications:

Zero-un Informatique (France)
Computing Canada (Canada)
EDP Notizie (Italy)
Sistemi E Automazione (Italy)
Computadoras Y Sistemas (Argentina)
China Computer Monthly (People's Republic of China)
De Automatiserings-gids (Holland)
Information (Chile)
Asian Computer Monthly
EQUIP (Greece)
Dagens Industry (Sweden)

Computing is an exciting industry, with a unique need for information. And the publications we produce provide that information to hundreds of thousands of computer people around the world. They are excellent vehicles for reaching these people with your advertising message, and we'd be happy to give you more information on any of them. Just call or write, Roy J. Einreinhofer, *Vice President, Marketing.*

CW COMMUNICATIONS/INC.
375 Cochituate Road, Route 30
Framingham, MA 01701 (617) 879-0700

Seminars
at
MIS DATA BASE

Seminars

AUDITING and SECURITY CONCEPTS for IBM's MVS OPERATING SYSTEM

AUDIT and CONTROL of DATA BASE SYSTEMS

MVS		DB
Mar 26-28	San Fran	Mar 19-21
April 16-18	Chicago	April 21-23
May 28-30	Houston	June 3-4
July 16-18	Boston	July 21-23

MIS ASSOCIATES
10-1 JUNIPER LANE
FRAMINGHAM, MASS. 01701
(617) 879-7800

'Logical Alternative'

End Users Turning to Third-Party Maintenance

By Stephen J. Keane
Special to CW

Sophisticated end users are increasingly turning to third-party firms for maintenance of their computer equipment.

More and more companies that own computers or obtain them from leasing companies are recognizing that independent maintenance is an attractive, cost-effective alternative to the service provided by major computer manufacturers.

Another reason for growth in third-party maintenance is the dramatic rise in the number of companies manufacturing and marketing DP systems and equipment. An increasing number of these firms are discovering that by arranging for a third-party maintenance specialist to service their products, the firms' personnel are free to do what they do best: design, manufacture and market products.

Despite its history of success and an outlook for 15% growth annually for the near future, independent maintenance has not always been a viable concept in the DP industry.

Traditionally, the major computer manufacturers leased complete systems to end users and were solely responsible for providing service for every component. When a user signed up for a system, he signed for its service too.

Two Changes

Two changes in the industry prompted end users to rethink this standard practice. The first of these occurred when military, governmental and other very large users began to separate system maintenance from system acquisition contractually.

The second change was brought about by independent manufacturers when they developed cost-effective, plug-compatible peripherals for use with the major computer systems.

Today, most users of DP equipment are sophisticated both financially and operationally.

Financial sophistication has led to a recognition that a computer system is a business tool. This tool can be owned and treated as an asset. Alternatively, however, it can be leased from sources other than its manufacturer. Moreover, maintenance and operation of this tool can be treated separately from hardware itself.

Operational sophistication has given end users the confidence to select and use the most cost-effective DP combinations to meet user needs, regardless of component nameplates. Multivendor systems abound as users seek to maximize results.

Interestingly, the prime advantages of third-party maintenance — costs that average around 20% less than comparable service from a major system manufacturer, and centralization of maintenance responsibility — provide benefits to end users that are financial and operational, respectively.

Balanced Combination

The service provided by independent firms attempts to balance remedial and preventive maintenance.

Most users appreciate the value of remedial maintenance. When something fails, they want it fixed immediately. Some companies, however, still consider preventive maintenance unnecessary — a waste of machine-time.

Actually, the opposite is true. Preventive maintenance ensures against equipment failure and helps prevent repair expenses. In light of the sophistication of today's DP equipment, guarding against equipment problems is equal in importance to being able to solve such problems quickly when they occur.

Contracting for Service

The complexity, maintainability, failure-ratio and type of system to be serviced determines fees charged by independent maintenance firms, as well as the extent of maintenance responsibility assumed.

In most instances, the independent firm will thoroughly inspect each end-user system — much like a doctor conducts a physical examination — and arrive at an annual service fee, usually paid in monthly installments.

Many third-party maintenance contracts cover complete systems (all components, peripherals, auxiliary equipment and so on) and provide price protection to the user.

When contracting for maintenance, the customer and the independent maintenance firm work together closely to determine the scope of services to be provided.

The service firm should also be knowledgable of the company's work routine, so that preventive maintenance can be scheduled without interfering with processing deadlines.

In addition, full consideration must be given to such important factors as the proximity of service and support locations, each firm's average response time to service calls, the extent of spare parts on hand at service locations, the range of services provided and the types of test and diagnostic equipment available.

The prospective customer should carefully examine the training programs of each independent maintenance firm. Is training an ongoing process? Is it a high-priority activity with sufficient funding to have invested in modern training tools such as closed circuit television and videotape playback units? Does the firm keep pace with manufacturer changes and modifications? In all cases, the answer should be "yes."

New Entrants

Manufacturers entering the DP market for the first time can utilize a large-party maintenance organization for virtually every aspect of customer service.

The benefits are immediate and significant. Payment of a single, known fee on a monthly basis prevents financial suprises. Avoidance of large start-up costs usually associated with launching a service organization permits concentration of resources of design, manufacturing and marketing.

In short, in new-entry situations where dollars are scarce and each has tremendous leverage for a growing firm trying to capture a market as rapidly as possible in a high-technology industry, the ability to turn to a professional maintenance company has great economic appeal.

Keane is president of Sorbus, Inc., a maintenance firm.

SHOCKWATCH

Because a disk pack can be an accident waiting to happen.

Shockwatch® is a proven impact detector which can prevent the loss of damaged disk packs and cartridges. Media Recovery, Inc. 1420 Hawthorne, Dallas, TX 75247 Call toll free: 1-800-527-0487

—FRANCHISE—
COMPUTER MEDIA SUPPORT

Individuals with a proven track record in media sales can now start or expand their own business with a MEDIA RECOVERY franchise. Printer ribbon rejuvenating, magnetic tape certification, and disk pack maintenance continued universal attention as basic costs continue to rise.

- High Earnings Potential
- Proven Concept
- Training— All Personnel
- Continuing Support
- Minimum Investment

Control your own destiny. Call or write:
BOB POLEY at (817) 948-8462,
MEDIA RECOVERY, INC.
BOX 667
GRAHAM, TEXAS 76046

Bank Controls Static, Grounds Teller Problems

(Continued from Page 55)

least infer that static was an important factor in many of them and that the 3M mats prevented static buildup from reaching the equipment."

As the company grew and added branch offices, the supply of floor mats was depleted, and several offices were put on the system without protective mats. The same kinds of problems began to show up.

Again a quantity of mats was ordered, this time the 3M Static Control Floor Mats specifically designed for stand-up (teller) applications. Again the problems abated.

Because of the low electrical resistance of the floor mats, an electrical charge is drained away rather than discharged rapidly. As personnel step on the conductive mats during normal work movements, static charge is drained to ground instantly.

Fortunately for California Federal and other DP users, the static problems they normally encounter can be solved by the use of passive conductive floor mats. No operator effort is required.

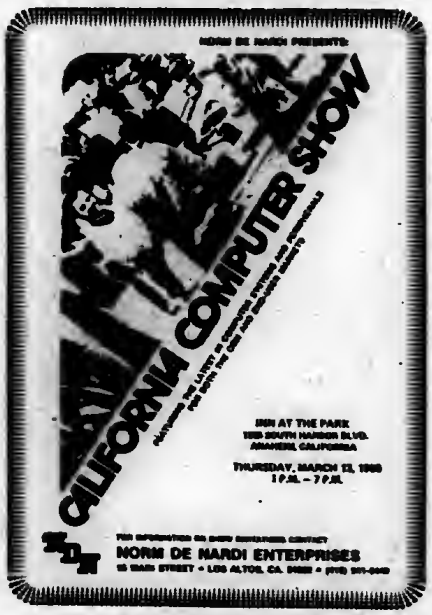
TERMINALS
FROM TRANSNET

PURCHASE FULL OWNERSHIP AND LEASE PLANS

DESCRIPTION	PURCHASE PRICE	PER MONTH 12 MOS.	24 MOS.	36 MOS.
LA36 DECwriter II	$1,895	$182	$ 88	$ 61
LA34 DECwriter IV	1,295	124	60	47
LA120 DECwriter III KSR	2,295	220	122	83
VT100 CRT DECscope	1,895	182	101	68
VT132 CRT DECscope	2,295	220	122	83
DT80/1 DATAMEDIA CRT	1,895	182	101	68
TI745 Portable Terminal	1,695	163	88	57
TI765 Bubble Memory Terminal	2,795	268	149	101
TI810 RO Printer	1,895	182	101	68
TI820 KSR Printer	2,195	210	117	79
TI825 KSR Printer	1,895	182	98	61
ADMIDA CRT Terminal	875	84	47	32
QUME Letter Quality KSR	3,195	306	170	115
QUME Letter Quality RO	2,795	268	149	101
HAZELTINE 1410 CRT	875	84	47	32
HAZELTINE 1500 CRT	1,195	115	64	43
HAZELTINE 1552 CRT	1,295	124	68	47
DataProducts 2230 Printer	7,995	767	421	284
DATAMARK Mini Floppy	1,795	168	83	63

FULL OWNERSHIP AFTER 12 OR 24 MONTHS
10% PURCHASE OPTION AFTER 36 MONTHS

ACCESSORIES AND PERIPHERAL EQUIPMENT
ACOUSTIC COUPLERS • MODEMS • THERMAL PAPER
RIBBONS • INTERFACE MODULES • FLOPPY DISK UNITS
PROMPT DELIVERY • EFFICIENT SERVICE



DG Expands CS Mini Family With Mid-Range Processor . . .

WESTBORO, Mass. — Data General Corp. has extended its Commercial Systems (CS) minicomputer line by adding a mid-range mainframe that handles up to nine interactive terminals for in-house local networks and supports RJE 80 and Hasp II communications protocols for decentralized DP activities.

At the same time, the company unveiled three program development software packages designed to fit all of the CS machines and introduced an upgrade option that allows users to move up to a more advanced CS computer without scrapping the entire processor.

Finally, the firm announced that its recently introduced Model 6100 dual-disk subsystem, that boasts either a 12.5M-byte or 25M-byte Winchester hard disk and an integral 1.26M-byte diskette, will now be available with all of the CS minicomputers — including the new addition.

Sandwiched between DG's CS/40 and CS/60, the CS/50 is built around the firm's Nova 4 processor, which has a cycle time of about 200 nsec. This speed compares with a 960-nsec cycle time for the company's low-end CS/20, which incorporates a Micronova processor, and a 700-nsec cycle time for both the CS/40 and CS/60, which use a Nova 2/12 or 3/D and Eclipse S/130 processors, respectively.

The CS/50 is available in three models: the C3, C5, C6. The first system supports 64K bytes of memory and up to three Dasher terminals, including the recently announced D/200 model. In addition, the computer setup comes with either a dual-disk subsystem or a 20M-byte fixed disk drive. The system also includes a magnetic tape drive with 800- and/or 1,600 bit/in. tape densities, a spokeswoman stated.

The models C5 and C6 include either 128K or 256K bytes of main memory and up to 80M bytes or up to 760M bytes of disk storage, respectively. Both models can handle up to nine Dasher terminals depending on the application, she added. In contrast, DG's top-of-the-line CS/60 system supports up to 17 terminals.

Upgrade Option

For the first time, users of lower-end CS systems can upgrade to a more sophisticated mainframe without having to go through extensive field service surgery.

CS/40 systems can be boosted to a CS/50 or CS/60, and CS/50 machines can be upgraded to a CS/60, by removing the mainframe subassembly and plugging in a new component. Before, the whole processor would have to be replaced.

While upgrade prices may seem a bit high, a DG spokesman noted that they are cost-effective for users who intend to keep their systems for a few years or more. To upgrade from a 128K-byte CS/40 computer to a

(Continued on Page 60)

The CS/50 System

. . . And Unveils Band Printers

WESTBORO, Mass. — Several days prior to introducing its Commercial Systems (CS)/50 minicomputer, Data General Corp. unveiled a family of 300 line/min band printers and printer subsystems that are said to use a minimum of mechanical parts and feature a built-in diagnostic display.

Designed separately for DG's Micronova, Nova, Eclipse and CS computers, the printers all feature a steel band font carrier to aid in character registration and an LED diagnostic display. This display, together with a built-in self-test function, allows the printers to run independently of the computer system.

The models 4323 and 4324, for Micronova systems, have a forms length selector, a 12-channel direct access vertical format unit, a forms receiver tray and a 30-ft I/O cable. They offer 64- and 96-char. sets, respectively.

The models 4325 and 4326, for the Nova and Eclipse minicomputers, are based on the two previous printers but include a programmed I/O controller. Two other models, the 4327 and 4328, are similar to the 4323 and 4324, but are supplied with a data channel controller.

Introduced for the CS machines, the models 9260 and 9261 are programmed printer subsystems available with 64- and 96-char. sets, respectively. Finally, the models 9262 and 9263, for the CS line, include a data channel instead of an I/O controller.

Prices for the printers are $9,500 for the Model 4323; $10,400 for the 4324, 4325, 4327, 9260 or 9262; and $11,300 for the 4326, 4328, 9261 or 9263 system. Quantity discounts are available from DG at Rt. 9, Westboro, Mass. 01581.

ABC Turnkey Package Includes Training Trip to Lake Tahoe

TAHOE CITY, Calif. — Sailing, skiing and a bit of gambling may not be the kind of options usually offered with a computer system, but they are included as part of the turnkey package announced recently by ABC Computers, Inc.

The system, called a "Minichester" word processor, is based on Digital Equipment Corp.'s LSI-11 processor and incorporates a double-density floppy diskette drive, 64K bytes of memory, a CRT and a printer. However, the system's $14,900 price tag also includes the tab for air fare and hotels for software training in the Lake Tahoe vacation area, a spokesman said.

Mornings are spent in training sessions while the user's afternoons are free to take advantage of whatever the resort has to offer, he added.

The Minichester is said to be capable of executing the firm's business accounting software and operates with the Basic, Fortran, Cobol, APL and Macro-11 languages.

OEM discounts are available and start at 18%, including the customer training trip, or at 25% for OEMs who supply their own training. ABC is located at 500 Tonopah, P.O. Box 7529, Tahoe City, Calif. 95730.

DEC
LA34
LA36
LA120
VT100

DAS, the single source for trouble-free telecommunications. Nationwide.

With fully-stocked branch offices located from coast to coast, DAS, the nation's largest independent supplier of terminals, has the facilities and capabilities to provide instant, off-the-shelf delivery, sophisticated applications assistance, and super, on-site service at the lowest possible cost.

You save time and trouble with our free, 90-day warranty available on terminals like the new VT 100 CRT with 132 column screen size and over 30 state-of-the-art products from TI, Diablo, Lear Seigler, Teletype, Hazeltine and Datamedia.

The unique DAS protection plan covers not just the terminal, but every systems component we sell. So, when you need service, there's only one reliable source to call. DAS' own computer-dispatched technicians arrive on-site within one working day or less.

So, join the thousands throughout the country who depend on Data Access Systems, the single source for trouble-free telecommunications. For information on economical lease or purchase plans or details on a complete range of supplies call your local district office, or toll free: (800) 631-6604 or 9988.

Data Access Systems, Inc.

DAS
THE DATA TERMINAL AND SYSTEMS PEOPLE

Floppy Disk Memory Ties DEC, IBM Processors

SANTA CLARA, Calif. — A double-sided flexible disk memory system, said to be the first such system compatible with Digital Equipment Corp. and IBM diskette formats — including IBM double-sided, double-density format — has been introduced by Data Systems Design, Inc. (DSD).

The DSD 480 reads and writes on both sides of industry-standard 8-in. diskettes, delivering a formatted data capacity of 1M bytes per diskette, or 2M bytes of on-line storage. The system is hardware-, software- and media-compatible with DEC's LSI-11 and PDP-11 processors and reportedly doubles the capacity of competing DEC-compatible flexible disk systems.

In addition, the disk system allows users to transfer data and programs between DEC and IBM mainframes. For example, a firm with DEC production control computers can supply production information to an IBM-based accounting system by interchanging diskettes, a DSD spokeswoman stated.

Incorporated into the disk system are a variety of user-oriented features such as a built-in hardware bootstrap.

The system is packaged in a 5.25-in. chassis for rack mounting or tabletop operation. With documentation, it costs $4,495 from DSD at 3130 Coronado Drive, Santa Clara, Calif. 95051.

Value Computing Inc.
Software Systems For More Efficient Data Centers

VCI

Run ISAM files on 3330-11 and 3350 with DOS/VS Rel. 34 and DOS/VSE

With the Value Computing Advanced Function ISAM 3330-11 3350 Native Mode Support—

- No reassembly of your programs
- No changes to your JCL
- Completely transparent to Operations

Please send me more information about ISAM Native Mode Support

Value Computing Inc.
300 VCI Building, W. Marlton Pike
Cherry Hill, NJ 08002 • NJ (609) 429-4200
Toll-Free (800) 257-8242

Name Title
Company Phone
Address
City State Zip
CPU Operating System

The IAS-32 With Optional Printer

DEC-Based Business System Allows Both WP and DP

ROCKAWAY, N.J. — Information Access Systems, Inc. (IAS) has unveiled a 16-bit business system that incorporates a packaged version of Digital Equipment Corp's PDP-11/03 processor and can be used for both word processing (WP) and data processing activities.

The IAS-32 is a 64K-byte machine built around a Zenith Data Systems WH-11A microcomputer. The system can support up to four terminals and handle multiple printers, according to an IAS spokesman.

The heart of the computer is the Dibex operating system, a plug-compatible software package made up of a series of time-sharing-oriented programs. Similar to DEC's Digital Business-Oriented Language (Dibol), Dibex allows users to perform several similar or different tasks by sharing the same hardware resources, the spokesman noted.

Included with the basic IAS-32 package is WP software that lets a user enter text without stopping to enter margins, tabs or page locations. Word Syst permits proofreading, correcting, reformatting or the insertion of new text after the original text has been entered, the spokesman claimed.

In addition, a library feature allows storage and retrieval of those frequently used or standard paragraphs.

Biz Syst, a general business software package, is available as an option for the wholesale, distributor and retail user. The package includes accounts payable, accounts receivable, general ledger, payroll and order entry/inventory, the spokesman said.

Each Biz Syst system contains a "getting started" section that gives the user sample test data. The user can proceed through the software step-by-step, then compare the test results contained in a systems manual with the data appearing on the system's CRT screen — helping the user learn how to operate the computer.

To further the learning process, IAS offers an optional three-day training program at both its New Jersey and Chicago test centers. Instructors there are available for training, to respond to questions and to aid in setting up either a WP or DP system or both.

The basic IAS-32 with the WH-11A processor, CRT terminal and dual-floppy disk drive costs $9,635. The business software system, Biz Syst, is priced at $995.

The training course costs $350 if purchased with the system or $500 if acquired after purchase.

IAS is located at 87 Hibernia Ave., Rockaway, N.J. 07866.

Free Booklet Details Switch for PDP-11

WILTON, Conn. — T-Bar, Inc. has released a brochure describing its Series 3000 peripheral switch, compatible with Digital Equipment Corp.'s PDP-11 family.

The switch reportedly lets users share peripherals between multiple PDP-11s.

The brochure can be obtained from T-Bar, 141 Danbury Road, Wilton, Conn. 06897.

SPECIAL PURCHASE
EXECUPORT 300
PORTABLE TERMINAL

$695 LIMITED QUANTITY AT THIS PRICE
(ORIGINAL PRICE—$3300)

- Portable, light-weight terminal
- Operates at 10-15-30 cps
- Thermal printer
- Quiet NCR mechanism
- Built-in acoustic coupler
- Upper & lower case
- 10-key numeric pad
- Rental returns—fully tested
- 30-day on-site warranty
- Maintenance contract available
- Carrying case

QUANTITY DISCOUNTS AVAILABLE

INEXPENSIVE, ONE-STOP
COMPUTER HARDWARE, SOFTWARE & MICROFILM SHOPPING!

iTi
Information technologies, inc.
VISA
• New York (212) 938-6945 • Houston, TX (713) 799-6738
• Manchester, NH (603) 668-8977 OEM inquiries invited

'Langhorn Has a Special Rapport With Computers That Few Have.'

Broker Turns to Technology for Personal Touch

Special to CW

PHILADELPHIA — When clients step into the office of a particular stockbrokerage firm here and request a rundown of their portfolios, Bruce Fischer will probably turn to a minicomputer rather than a set of paper files to satisfy them.

Fischer is vice-president of Moseley, Hallgarten Estabrook & Weeden, Inc. He uses an IBM 5110 small business computer to track his clients' standings in the always-changing, never-predictable stock market.

By punching in a client's account number, Fischer can tell how many shares of each stock that client owns, the date they were acquired, date sold, the price paid and other pertinent details.

According to Fischer, his system software, called the Securities Portfolio and Transactional Analysis Program, is the first of its kind. It was developed with the help of IBM and Martin D. Pine, a consultant based in East Brunswick, N.J.

"I do not charge my clients for this service," Fischer stated. "More important is that if one stock is showing a change, with one symbol I will know how many and which clients own the stock, how much they own and what they paid for the stock."

By programming a letter into the computer, the 5110 will write identical letters to each client, Fischer explained. The system also includes a text editing and word processing system.

At present, Fischer has more than 70 complete portfolios, representing 60% of his annual commission business, stored on memory disks and is gradually increasing it.

"In order to increase available business time — my most valuable asset — I knew I had to organize and computerize my entire operations," Fischer said, looking back. Also, it was important that I maintain the confidentiality of my clients' accounts and the securities I purchase and sell.

"Today my system has three times the capacity and speed at one-third the price available in 1975," he added.

Monthly Portfolios

What exactly does the securities analysis program do? According to Fischer, it can produce a portfolio valuation, a portfolio analysis, a transactional analysis, a client/security retrieval system and a selective financial/securities reporting service for instant delivery of research reports and analyses in any investments, stocks or bonds.

As part of this self-contained desktop system, Fischer is now providing his clients with detailed, monthly portfolio reports. The ordinary monthly report from a securities company merely indicates transactions and not complete portfolios, Fischer noted.

"While I have access to my company's analyses, my own computer is considerably more detailed and specifically relates to my own clients," he said. "With these monthly reports, a client can see at a glance where he stands with each stock held and decide whether he wants to make any changes."

Although Fischer would not divulge the size of his personal business, reports indicate that his commission production places him in the top 2% of the New York Stock Exchange's registered representatives.

Word Processor Has Dual CRTs

PALO ALTO, Calif. — Artec International Corp. has announced the Dual-Display, a word processing system that features a full-page CRT plus a single-line CRT keyboard.

The Dual-Display system consists of the two screens, a remote printer and a disk module. The 66-line CRT screen shows a full page of text, while the single-line screen prompts the operator, verifies commands or zeros in on a particular line of text.

In addition to underscoring, bold characters and super- and subscripts, the CRT is proportionally justified, showing the user exactly what will appear on the printed page, a spokesman said.

The system can store 200 pages of text per floppy diskette and can be used as a shared resource system that can be configured as a cluster of various workstations. Users can reportedly add up to four disk drives and eight workstations that can be a mix of CRTs, electronic display keyboards, printers or typewriters.

The Dual-Display costs about $10,500 without printer. Initial deliveries are expected sometime this quarter, Artec said from 2585 E. Bayshore Rd., P.O. Box 10051, Palo Alto, Calif. 94303.

'I Think Frank's Been Debugging Long Enough.'

Your DP training is an investment!!

Make it a profitable one with the help of Edutronics/McGraw-Hill

Money spent on DP training is an investment. The expected dividend, of course, is an increase in efficiency and productivity. So why gamble with your money and your people. Invest in an organization with an international reputation, extensive resources and unlimited growth potential. Invest in Edutronics/McGraw-Hill. We can help make the most of your training investment today as well as tomorrow. Whether it's DP training in subject areas such as CICS, TSO, VSAM, MVS or even managerial training for DP personnel, we've got what you need. For more information on making the most of your DP training investment, write or call us toll free at 1-800-255-6324. We'll turn your investment into a profit.

Edutronics/McGraw-Hill
55 Corporate Woods, 9300 W. 110th St.,
Overland Park, Kansas 66210

Tell me more about an Edutronics/McGraw-Hill training investment

Name _____

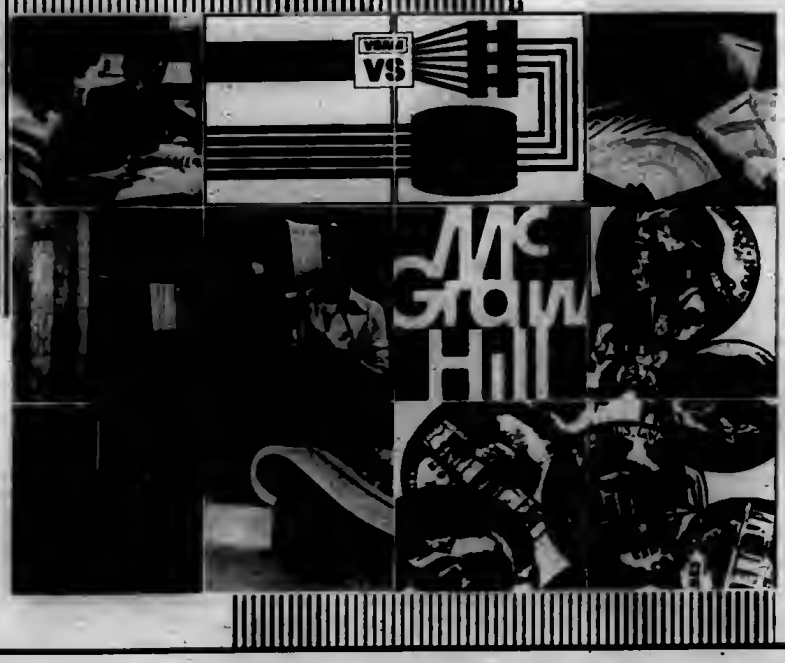
Company _____

Title _____

Address _____

City _____ State/Province _____ Zip _____

Phone _____



File System Cross-References by Number, Code

PALO ALTO, Calif. — A microprocessor-based key-to-diskette filing system designed to cross-reference data by numbers or code names has been announced by Tab Products Co.

The Tab 780

The Tab 780 has a typewriter-style keyboard with a 10-key numeric pad that provides access to data stored on a series of floppy diskettes. In the basic system, the diskettes store 1,900 128-char. records that can be inserted, deleted or updated randomly, a spokesman said.

For hard copy, the system uses either a General Electric Co. Terminet 30, 120, 310 or 340 printer, with speeds ranging from 30 char./sec to 340 line/min.

Finally, in addition to the cross-reference application, a separate and optional mailing list program is available that can be used to organize and print labels and lists.

The system can reportedly locate names or data in the diskette file within about three seconds. The station is geared for such applications as hospitals and medical clinics, banks, manufacturing and distribution, insurance companies and other firms that require easily retrieved file information.

The 780 costs range from $7,200 without a printer to about $10,000 to $16,000 with a printer, depending on the Terminet model selected.

Tab is located at 2690 Hanover St., Palo Alto, Calif. 94304.

For MPUs Using Multibus

Single-Board Controller Unveiled

SUNNYVALE, Calif. — Microcomputer Systems Corp. (MSC) has unveiled a single-board controller for microcomputers using Intel Corp.'s Multibus bus structure that can control up to four Shugart Associates, Inc. SA4000 Winchester drives, four SA850 floppy disk drives or four SA4000 drives plus a 3M Co. HCD-75 magnetic tape unit.

The MSC-1086 controller is an extension of the MSC-1080 series which interfaces Shugart's SA4000 series drives to a variety of microprocessor buses. All of the units control multiple drives, including the 14.5M-byte SA4004, the 28M-byte SA4008 and the 58M-byte SA4100.

In addition, all the controllers, including the 1086, are based on a bipolar microprocessor, a spokesman stated.

Multibus Interface

The Multibus interface on the 1086 board connects to the parallel data bus structure that was originally developed by Intel for 8080-, 8085- and 8086-based single-board microcomputers.

Besides including the standard formatting and operating functions, the controller also boasts command chaining, error checking and correction, write protection, automatic head and cylinder switching, relative addressing and automatic seek to alternate disk tracks, the spokesman noted.

In addition, the controller can verify positioning for the MPU, test itself and buffer data transfers to eliminate overrun and underrun programs, he noted.

The MSC 1086 is priced from $2,700 depending on the user's disk drives. Quantity discounts are available from the firm at 432 Lakeside Drive, Sunnyvale, Calif.

Mid-Range Mini Extends CS Line

(Continued from page 57)

128K-byte CS/50 costs about $14,100, and moving from a CS/40 or CS/50 to a CS/60 costs approximately $24,750.

The new software for the CS machines, which run under the Interactive Cobol Operating System, is reportedly structured to reduce the amount of time a user spends on program development. The first program, called First, is said to produce error-free Cobol code by automatically generating complete source code programs.

Programmers can use the software to generate programs for standard application functions by responding to questions flashed on the computer's CRT screen, the spokeswoman explained. First stores code in copy files, creating a library of function modules. These modules can then be incorporated into other applications.

The First routines are geared for such applications as file maintenance, inquiry handling, screen generation and transaction entry, she added. The software can be run on all the CS machines, including the CS/30 that debuted last year. But, it will not function on the CS/20 although the low-end computer can run First programs generated on other CS systems.

'Master' Package

The second package, Master, works similarly to First but allows a programmer to generate both a menu system, to tie an application's programs together, and a security system, to protect programs and data. The menu system reportedly lets users plan and create uniform menu structures without additional programming.

'Jobs' Software

Finally, DG unwrapped its Job-Oriented Batch Stream (Jobs) software that allows operators to define and execute a stream of batch programs in bulk rather than having to start each one individually. The system continuously displays current status information on the process and signals the operator if an interruption occurs.

The Jobs utility comes standard with CS system software. First normally costs $6,000 for an initial licensing fee, but is priced at $4,000, as an introductory offer, during the next 90 days. By the same token, Master usually sells for $1,500, but will cost $1,000 during the introductory period.

Package Prices

The CS/50 C3, with three Dasher display terminals, a 20M-byte disk cartridge subsystem and a 60 char./sec Dasher terminal printer costs $38,350. The same system but with a 12.5M-byte Winchester disk and a 1.26M-byte diskette sells for $32,450.

The C5, including five Dasher terminals, the 20M-byte drive, a 300 line/min printer, a magnetic tape subsystem, one synchronous communications line and the RJE 80 software costs $67,750. With the 25M-byte Winchester drive the system costs $62,350.

The C6 with the same features as the C5 except for a 50M-byte instead of a 20M-byte disk sells for $76,050.

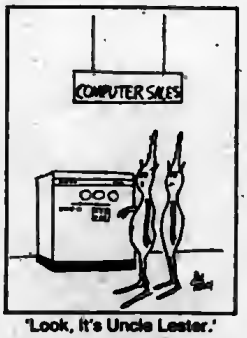
All of the system packages include the license to use DG's interactive Cobol software and system utilities, the spokeswoman said from Rt. 9, Westboro, Mass. 01581.

Two Pi Offers Booklet on V32

SANTA CLARA, Calif. — Two Pi Corp. is offering a booklet describing its V32 minicomputer which can execute industry-standard IBM 370 software without reprogramming and can use IBM and IBM-plug-compatible peripherals.

The literature also contains a brief description of the V/32's proprietary microprogram-controlled architecture.

The brochure is available from Two Pi at 3105 Patrick Henry Drive, Santa Clara, Calif. 95050.



'Look, it's Uncle Lester.'

COLLECTIVE INTELLIGENCE:
η HEADS ARE BETTER THAN ONE
AN INTENSIVE 3-DAY SEMINAR
DISTRIBUTED COMPUTER ARCHITECTURE
JENSEN
SAN FRANCISCO April 7-9, 1980
Call for information (213) 476-6747
TECHNOLOGY TRANSFER INSTITUTE
P.O. BOX 49793, LOS ANGELES, CA. 90049 (213) 476-6747

Discover why hundreds of PDP-11 users have turned to us for Pascal.™

They're in process control. In data base management. In education, research and communications. Running on LSI-11's, PDP-11/70's and everything in between. RSTS/E, RT11, RSX or IAS — it makes no difference, they prefer our Pascal.

Because they all have one thing in common. A desire to get more from their PDP-11 than another language — or another Pascal — can provide.

We've captured the elegance of Pascal in a real world compiler. It converses directly in machine language, giving remarkable execution speed and efficient memory use. It features straight-forward program structure, uncluttered syntax, and other advantages of full standard Pascal.

But there's more. In the form of real-time extensions. 15 digit (double precision) arithmetic. In-line assembly code, I/O hardware access. FORTRAN interface. Direct-access files. Overlays. Plus others. There's even an interactive symbolic debugger.

Reliability? Introduced in 1975, we're at over 400 sites now. We guarantee stated performance and provide 1 year of follow-up support. Give us a call; we have a demo library, manuals, and benchmark, ready for your inspection.

Oregon minicomputer Software inc.
2949 SW Canyon Road
Portland, Oregon 97201
(503) 226-7760
TWX 910-464-6779

Distributors:
Australia: Sydney: Network Computer Services, 290 3677
Canada: Vancouver: Valley Software, (604) 524-9911
England: Guildford: Pounds Computing Ltd. 0483 64231
Japan: Tokyo: Elbit Corporation, 03-343-1411

PDP-11, LSI-11, PDP-11/70, RSTS/E, RT11, RSX, and IAS are trademarks of Digital Equipment Corporation

Magnuson Moving Into Two More Markets

By E. Drake Lundell Jr.
CW Staff

SAN JOSE, Calif. — Magnuson Systems Corp., maker of IBM-compatible mainframes, will be moving into OEM and industry-specific markets during the coming year, President Joe Hitt disclosed during a recent interview.

The move is highlighted by Magnuson's recent $10 million OEM contract with Storage Technology Corp. (STC), which will use a tailored Magnuson mainframe in an as yet unspecified product. Industry sources have speculated, however, that STC is developing a data base processor around the Magnuson computer.

Furthermore, Magnuson is expected to emphasize its OEM thrust within the next few weeks with the announcement of a processor tailored for that marketplace.

The move is built on a base of strong sales in the straight IBM replacement marketplace, Hitt indicated. A privately held firm, Magnuson had sales of more than $10 million last year — essentially its first full year of operation — and has shown a profit since August.

End-user sales are strong, Hitt claimed indicating that the firm was shipping 10 systems a month at the end of the year, the maximum capacity of its old plant. Sixty systems are now installed, he said.

The firm recently moved to new facilities to overcome the production bind and now can expand to a production capacity of 60 machines per month, Hitt said.

While most of the orders have been replacements for IBM computers already installed, about 10% of the orders have been for first-time users, he added.

However, the extensive use of microcode and the bus-based architecture featured by the Magnuson machines allows the firm to easily tailor them for OEM or specific applications, Hitt said, leading the firm to open new marketing thrust in these areas.

Over the next few years, Magnuson expects OEM sales to reach about 10% to 15% of total sales.

As to custom systems for particular industry niches, Hitt cited the Exchange Bank in Tampa, Fla., where Magnuson and the user developed a system to control an IBM check sorter with a Magnuson computer, providing the user a 4:1 improvement over the IBM-based system.

(Continued on Page 67)

Case-by-Case Review Expected

Freeze on Soviet Trade Seen Thawing

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — A slight easing of the embargo of technology exports to the Soviet Union is expected when the Carter Administration completes its review of trade policy in the coming week or two, according to government and industry representatives contacted here recently.

An interagency policy review committee, reviewing licensing of exports to the Soviet Union, is expected to produce an overall policy more flexible than the almost complete cutoff of high-technology goods now in effect.

While the government has permitted some goods to be exported for humanitarian reasons, such as spare parts for medical facility equipment, in general all trade with Russia in high-technology products — from tractors to computers — has been shut down.

The interagency committee, representing the Commerce, State, Defense, Treasury and Agriculture departments and including several federal trade officials such as U.S. Trade Representative Reuben Askew, has been studying U.S.-Soviet trade since President Carter stopped all technology exports Jan. 11 in response to Soviet military action in Afghanistan.

The new trade policy, expected to be announced soon, will probably allow for a resumption of case-by-case review of export license applications, presumably with some of those receiving approval, according to a Commerce Department spokesman. The department also said there are no plans to include Eastern Bloc countries in the trade restrictions.

There has been some confusion here over whether Carter intended those Russian allies to be included in the embargo. The question is part of the interagency committee review, and Commerce officials have said they will watch exports to those countries to make sure goods are not being channeled to the Soviet Union.

Lloyd Kaufman, director of foreign policy programs with the Computer and Business Equipment Manufacturers Association, speculated that the Administration might institute a "two-track" review system, permitting technology trade with Eastern countries that have Most Favored Nation status, such as Romania and Hungary, but curtail trade to those that do not, which includes the Soviet Union, East Germany and Czechoslova-

(Continued on Page 66)

Lockheed Sells Mini Named Sue

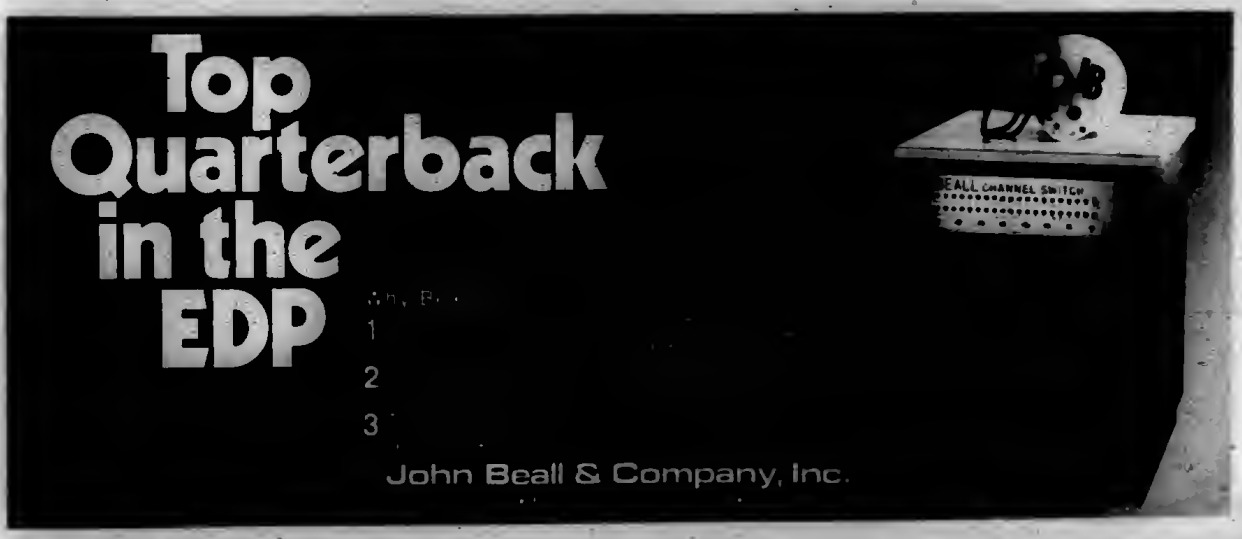
CAMBRIDGE, Mass. — BBN Computer Corp., a recently formed subsidiary of Bolt, Beranek and Newman, Inc., has agreed in principle to acquire the inventory, rights and other assets relating to the manufacture of the Sue and Super Sue minicomputers, now made by Lockheed Electronics Co.

Primarily a developer of weapon control systems, Lockheed recently dropped out of the computer business, which it entered in the early 1970s.

Aside from Sue and Super Sue, Lockheed also marketed the Lockheed System III, aimed at the IBM System/3 market. However, these lines have not been profitable for Lockheed, contributing less than 4% of its annual $150 million sales volume.

BBN Computer is one of the major OEM customers for the Sue and Super Sue line. "This acquisition will protect an important source of supply and will enable us to expand our manufacturing capability," Dr. W.B. Barker, BBN Computer president, said.

Although no financial details were disclosed on the agreement, if the deal is completed BBN Computer will acquire Lockheed's manufacturing plant in Hong Kong, where the minicomputer line is fabricated.



DEC Steps Up Production

MAYNARD, Mass. — Digital Equipment Corp. confirmed it stepped up production of its Decsystem-10s and 20s four months ago at its Marlborough, Mass., plant.

Although the company would not disclose the amount it increased capacity, a source said a 30% production increase was made. DEC said it had some excess capacity at the plant and decided to allocate it to the manufacture of its large Decsystem-10s and 20s.

Prior to the step-up, DEC was delivering the systems within four to six months. Now the delivery is nine to 12 months, DEC said, adding the company thinks this is "adequate given the lead times for the rest of the industry."

DEC declined to comment on the reason for the longer delivery times despite increased capacity.

Telefile May Lose $2 Million

IRVINE, Calif. — Telefile Computer Corp. said that losses for fiscal 1979 ending Sept. 30 may exceed $2 million. As a result, the company will not be in compliance with certain financial covenants specified by its primary lender, the First National Bank of Chicago.

Telefile owes about $7.8 million to the bank and has pledged virtually all its assets as security for that loan. The bank also holds $3 million worth of preferred stock on which unpaid monthly dividends have accrued over the past seven months.

A dispute has arisen between the bank and the company over a $750,000 demand made by the bank last September. Telefile subsequently paid the bank.

The company is currently negotiating "an acceptable arrangement" with the bank, which reportedly will be concluded in the next few weeks, but said it could offer no assurances that the outcome would be favorable. Telefile Chairman Samuel V. Edens would not comment on the company's outlook for the immediate future.

The firm has retained Montgomery Securities of San Francisco to assist with the restructuring or discharging of Telefile's debt and with the search for additional working capital.

Source of Predicament

The company's financial predicament stems largely from the delayed development and introduction of its Xerox Corp. Sigma-compatible Telefile 85.

To complicate matters, Honeywell, Inc., which acquired the Sigma base from Xerox, has already introduced two competitive products. Introduced in 1978, the DPS/C, an upgrade for Sigma's CP-5 operating system, allows high-end Sigma users to run Honeywell's CP-6 system on the Level 66 DPS/C mainframe.

The Honeywell CP-6-driven Level 66/-DPS/B3 was introduced last year targeted for mid-range Sigma users [CW, May 21].

Honeywell, NEC Ending Pact

MINNEAPOLIS — A long-standing technical agreement between Nippon Electric Co. (NEC) and Honeywell, Inc., scheduled to expire in 1982, has already been partially ended with the termination of a section of the agreement on technical "know-how" exchange.

For nearly 20 years, Honeywell provided computer-related technical assistance to NEC in the research and development and manufacturing phases of the Japanese firm's hardware products. This kind of technical exchange is fairly common for joint venture purposes and is used to get one or the other company up to speed, a Honeywell spokesman noted.

No More Needed

Both companies indicated they no longer saw the need for such a technical exchange — a move that indicates the Japanese computer company is fully able to compete on its own merits without assistance.

The patent license section of the agreement — still in effect for three more years — allows NEC to manufacture and sell Honeywell Series 60 computers in Japan.

No decision has been made as to whether that portion of the agreement will be continued after 1982, according to the Honeywell spokesman.

DASD®

THE DASD DIAMOND MEANS QUALITY SOFTWARE

When it comes to innovative, accurate, quality software ... DASD shines. And the brilliance of our software line is a direct reflection of our commitment to develop efficient, accurate solutions for common data processing problems. As a result, DASD has developed a library of practical, fully documented software products.

We offer one of the most comprehensive lines of conversion tools available. Anywhere. Along with equally important utilities specifically designed to aid in conversion projects. In addition, we're constantly developing new products to provide increased proficiency and efficiency in typical day to day operations. Data base file utilities. Simplified screen mapping. Improved access methods. To name a few.

And for one of a kind customer needs, DASD's technical staff has total capabilities and much experience in creating customized programs.

Of course, software development is just the beginning. DASD also has a proven track record of maintaining our software products. And we're so certain of our consistent quality, that we confidently encourage a low-cost, no obligation test evaluation.

Quality software. That's DASD. And that's why more and more customers, including many Fortune 500 companies, are finding real worth in the DASD diamond.

DASD Corporation
Corporate Services Center
9045 North Deerwood Drive
Dept. DPQ25
Milwaukee, WI 53223
(414) 355-3405

PEOPLE/PRODUCTS/RESULTS

Atlanta • Baltimore/Washington D.C. • Chicago • Dallas • Des Moines • Detroit • Florida • Hartford • Houston • Indianapolis • Kansas City • Los Angeles • Milwaukee • Minneapolis • Omaha • Philadelphia • San Francisco • Seattle

Real quality is worth learning more about.

Name _____
_____
Title _____
_____
Company _____
Phone _____
Address _____
City _____ State _____ Zip _____

Have a specific software need in mind? Please specify.

SSTI to Be 'Aggressive and Mean'

By Ann Dooley
CW Staff

WOBURN, Mass. — A newcomer to the computer industry, Solid State Technology, Inc. (SSTI) intends to make its presence known to its minicomputer competitors by "coming out fighting."

"We're the new kid on the block" and therefore have to make a big impact quickly, SSTI President John Biondo stressed. "We're going to be known as a company that is aggressive and mean — a company that makes it its business to exploit other companies' weaknesses."

Previously a manufacturer and marketer of roadside call boxes, Biondo felt constrained by the government's bidding system and wanted to diversify. Recognizing the growth of the minicomputer market, Biondo brought his company into the computer market with the introduction of the Athena 8285 desktop computer at the National Computer Conference last year.

The Athena can reportedly expand from an intelligent terminal at the low end to a stand-alone processor at the high end.

Concentrating on OEMs

Selling primarily to the OEM market or to large system users, SSTI may eventually market to end users. For now, however, it would rather concentrate on building the technology and letting the OEMs market and sell its products.

Approximately 200 Athena 8285 machines have been shipped in the last few months since it went into production; the preproduction machines placed in installations account for many more, according to Roger Trudeau, director of marketing. Shipment backlogs total an additional $26 million, he claimed.

SSTI currently has 34 OEM customers and markets in Europe through foreign distributors.

And to prove its claim of aggressiveness, SSTI's sales are seemingly doing so well that the firm is moving its manufacturing facilities to a new, nearby plant as of March 1. Once in the 60,000-square-foot facility, SSTI hopes to produce as many as 70 systems a week.

"Coming in late, we can take advantage of existing technology to downsize and bring the price down," Trudeau noted.

Approximately 85 people will be hired for the manufacturing facility. SSTI has doubled its overall personnel since last July, lending credence to the claim that the firm is gearing up for strong competition.

Biondo considers himself a businessman and as a businessman did not hesitate to leap into the manufacturing of minicomputers, although he had very little knowledge of the marketplace or a technical background in computers. The same principles apply and the same problems exist in any business: "If you're good at one, you'll be good at any other," he contended.

Approaching the market with this attitude, Biondo hired a qualified staff of computer and marketing personnel, but he retained the business control.

Although admitting that SSTI will encounter problems, Biondo noted that the major one will be that of credibility.

The edge that SSTI has is that "we have no skeletons in our closet," the pleasant but feisty Biondo stated. "We don't have any friends we have to cater to or any hybrid machines built to replace others."

According to Biondo, SSTI doesn't have to fear the big companies because these companies have bureaucracies which create product, people and marketing weaknesses.

For the moment, however, other minicomputer companies are not really afraid of SSTI because it hasn't proven itself yet. "They won't be aware of us until we start to affect them — and then it will be too late," Biondo predicted.

CW Photo by A. Dooley
John Biondo

ARE YOU ADRIFT IN THE UNCHARTED SEAS OF TECHNOLOGICAL CHANGE?

How often and how drastically will technological innovation force your organization to alter its course of automation during the '80s? Will you be prepared for the inevitable changes in direction which automation will demand from your systems and procedures?

10th CONFERENCE ON COMPUTER AUDIT, CONTROL AND SECURITY
April 28-May 2, 1980,
San Francisco, California

You'll gain a valuable head start in coping with the rapidly evolving and increasingly complex computer technology of the '80s by participating in the 10th Annual Computer Audit, Control and Security Conference in San Francisco, California, April 28-May 2, 1980, under the auspices of The Institute of Internal Auditors, Inc., and Automation Training Center, Inc.

Acknowledged as the largest and strongest program ever presented in the field of computer audit, control and security, this conference will bring together almost 50 of North America's most qualified EDP audit practitioners, consultants, educators, authors and lecturers to share with you their ideas, experience and proven techniques.

Whether your mainframe is large or small — or your understanding of computer concepts is basic or advanced — you'll find a variety of sessions tailored specifically to help you assure the integrity of your information system. Emphasized among the topics will be

minicomputers and distributed systems • systems development audits • control over software • audit techniques • data base • operations and performance reviews • EDP performance reviews • EDP audit management • data communications • computer security • distributed systems.

Registration fees for the entire five-day conference, including the full day of tutorials on April 28, are U.S. $850 per person (excluding hotel accommodations).

If you wish to register for the four days of general conference activities beginning on April 29, the registration fees are U.S. $550, excluding hotel.

All conference materials, daily luncheons, coffee breaks and three evening receptions are fully covered in your registration fees.

We urge you to act now, so you don't miss out on this significant opportunity to plan for the future!

CONFERENCE REGISTRAR:
The Institute of Internal Auditors, Inc.
249 Maitland Avenue, Altamonte Springs, Florida 32701
(305) 830-7600

- ☐ Enclosed is a check payable to The Institute of Internal Auditors, Inc., in the amount of U.S. $850 to cover all registration fees for the *five-day conference* which includes the tutorials on April 28, 1980.
- ☐ Enclosed is a check payable to The Institute of Internal Auditors, Inc., in the amount of U.S. $550 to cover all registration fees for the *four-day conference* which begins on April 29, 1980.

ALL CONFERENCE ATTENDEES ARE ADVISED TO CONTACT THE SHERATON-PALACE HOTEL IN SAN FRANCISCO TO MAKE THEIR INDIVIDUAL ROOM RESERVATIONS. SINGLE ROOMS ARE $49/DAY; DOUBLES OR TWINS, $65/DAY. (415) 392-8600.

Registrant's name _____
Title _____
Organization _____
Business mailing address _____
City & state/province _____
Country _____ ZIP _____
Telephone (_____) _____ IIA member No. _____

Dept 6

Conference Panel Calls Warc a U.S. Success

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — While not a 100% success for the U.S., the 1979 World Administrative Radio Conference (Warc) did produce results that will allow American telecommunications companies to maintain existing operations while moving into innovative services, according to industry and government officials who met here recently.

Addressing a session of the recent Communication Networks '80 conference here, a panel of federal officials and industry executives were optimistic but by no means giddy about U.S. prospects for future use of the electromagnetic spectrum as decided at Warc, held in Geneva last fall.

Comments were typified by Edward Weppler, AT&T director of technical standards and regulatory planning, who said, "Our reaction is favorable."

Weppler, as well as representatives of Communications Satellite Corp. and Motorola, Inc., emphasized that the outcome of Warc, as of all international negotiations, represents a compromise.

They stressed, however, that no existing activities of U.S. telecommunications carriers would be significantly degraded and that the Geneva talks opened a number of opportunities to explore new services.

Tempered Enthusiasm

Their enthusiasm was tempered, they said, by the fact that the Warc business is far from settled. Although a treaty resulting from the conference goes into effect Jan., 1982, a number of world and regional conferences will be held during the next five years to iron out some of the fine points of the negotiations.

Warc, convened every 20 years by the International Telecommunications Union (ITU), a U.N. organization, controls the international allocation of the electromagnetic spectrum, governing all global communications from radio and television to advanced satellite-based data communications services.

The 1979 Warc brought together some 2,000 delegates from 152 countries to consider over 14,000 proposals.

Political Worries

They were also especially pleased at what did not happen, namely a large-scale politicization of the conference by the lesser-developed countries, whose numbers dominated the conference and who have become increasingly vociferous about U.S. and European domination of spectrum allocation.

There had been considerable concern in Washington that prolonged, sharp debate over the so-called "new world information order" would fragment the conference into arguments between developed and underdeveloped nations and North and South countries [CW, July 30].

Given these worries, the 1979 Warc can be considered "a great and glorious success," the networks conference was told Jan. 28 by panel member Glen O. Robinson, chairman of the U.S. Warc delegation.

An overriding U.S. objective was to maintain the integrity and structure of the ITU without politicization, Robinson said. Although any international negotiations are, of course, political in nature, the aim of the U.S. was to "minimize political disputes" and to steer the conference away from "abstract issues."

Donald Jansky, associate administrator of the National Telecommunications and Information Administration (NTIA), said "everyone ended up equally unhappy," which is his measure of a successful international conference.

Jansky predicted Warc "will spawn a great number of services" for computer communications users as well as vendors. There will also be increased markets for sophisticated microprocessor-based equipment to help fine-tune telecommunications networks coexisting in crowded sections of the spectrum, he said.

He emphasized that Warc is a treaty conference and must be approved by the U.S. Senate. NTIA and the Federal Communications Commission (FCC) have already begun organizing themselves to develop recommendations to implement the voluminous decisions made at Warc.

BEYOND THE COMPUTER.

Out in that sometimes hazardous network environment, the need is for a powerful communications processing system.

One that provides dramatic line cost savings and is transparent to existing hardware and software.

One that allows you to upgrade your network, not your mainframe.

The Codex 6000 Family of Communications Products.

A capability that solves many of your network configuration problems.

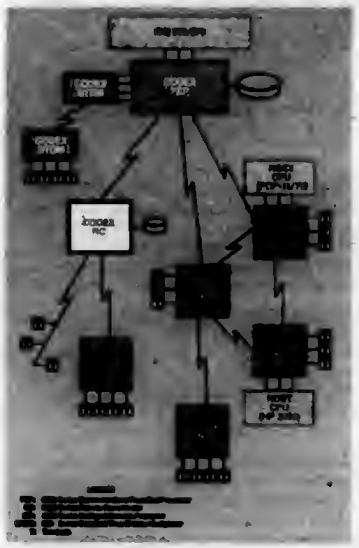
Plus network error detection and correction.

And, a monitoring capability which provides unmatched visibility of network operation.

The Codex 6000 Family consists of new 6500 Communications Front-End Processors providing 360/370 compatibility, powerful 6000 Intelligent Network Processors and 600 Series Statistical Multiplexers.

This kind of capability goes well beyond the computer.

And beyond anything else in its field.

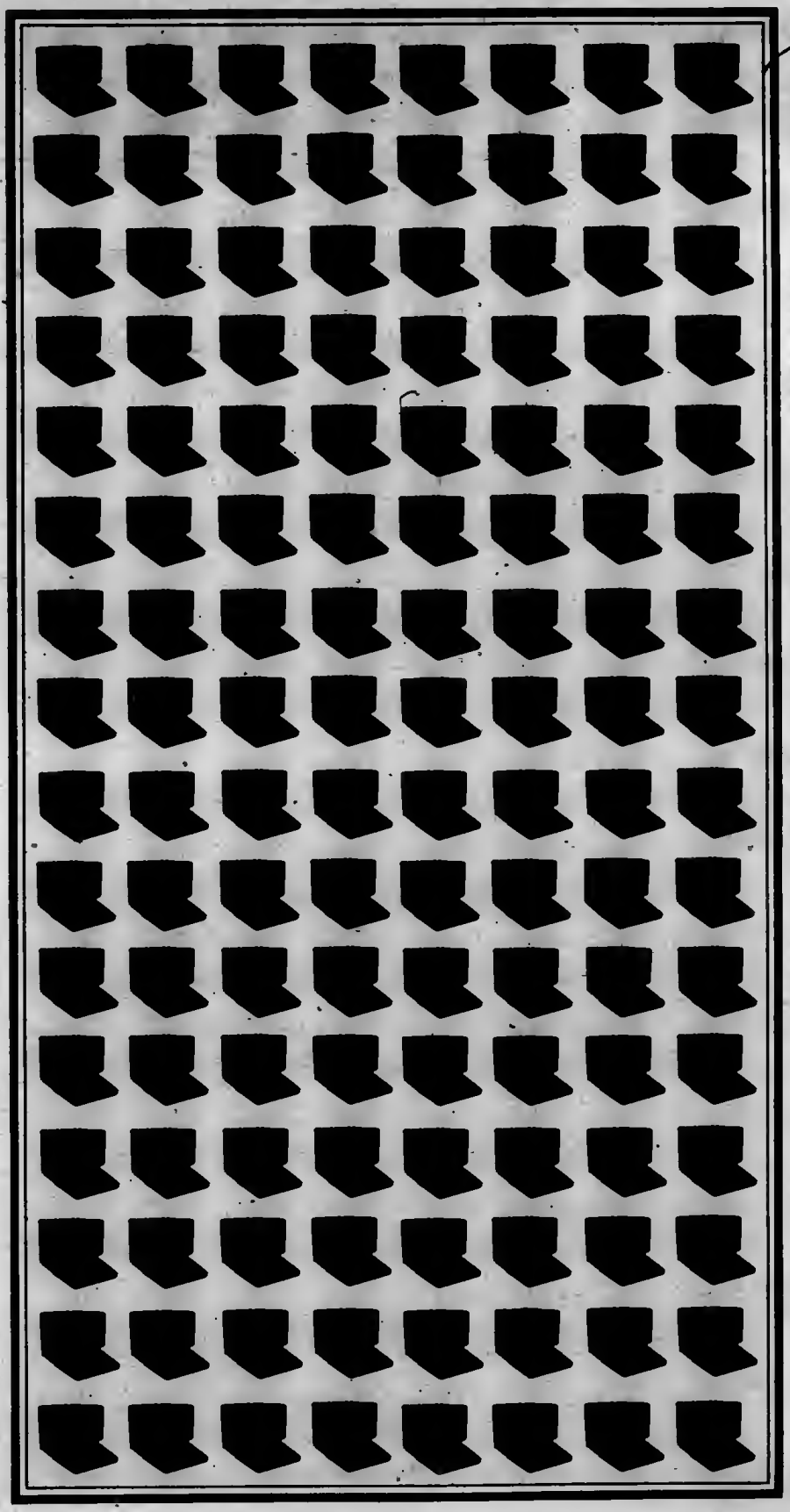


codex

We'll get you through

Codex Corporation, Dept. 707, 20 Cabot Boulevard, Mansfield, Mass. 02048 • Tel: (617) 364-2000
Telex: 92-3443
Tokyo, Japan • (03) 355-0422
Brussels, Belgium • (2[illegible]) 7[illegible].[illegible].51

member of IDCMA



129 reasons to buy the new Perkin-Elmer 3220 supermini.

You can build an ultra-high-performance, 128-terminal system on Perkin-Elmer's powerful new 32-bit Model 3220. That's 128 good reasons.

The 129th reason is our RELIANCE software—the transaction processing package that makes it all possible. The instantaneous terminal response. The ability to handle a variety of complex operations all at once. The unmatched throughput for a massive number of transactions. Even with all this power, a RELIANCE system is easy to operate.

RELIANCE integrates COBOL, data management, and transaction processing software. It's explicitly designed to deliver the reliability, integrity, and security so critical to applications requiring large amounts of on-line file processing. And RELIANCE protects your commercial data base from media faults and system failures.

Your application programmers can do all their development work, batch or transaction processing, in COBOL. With its enforced modular structure and built-in recovery routines, RELIANCE makes it easier to write, implement, and modify application programs.

The Perkin-Elmer Model 3220 is a supermini with built-in growth. Its memory can expand to meet the broadest system requirements. What's more, the low starting price of $33,500 (U.S. only) is subject to OEM terms and conditions unmatched in the industry. Get all the reasons for building a transaction processing system with the 3220 and RELIANCE.

Simply mail the coupon or call toll-free 800-631-2154. In NJ (201) 229-6800.

Perkin-Elmer
Oceanport, NJ 07757

Please send me your fact file on the 3220 and RELIANCE.

Name _____

Title _____

Tel _____

Company _____

Street _____

City _____

State _____ Zip _____

CW 216

PERKIN-ELMER

VDC Predicts Demand For Winchester Disks 'Tepid' in Year Ahead

WELLESLEY, Mass. — In spite of industry optimism, Venture Development Corp. (VDC) here predicted the demand for 8-in. Winchester-type disks will be "tepid" for the next year.

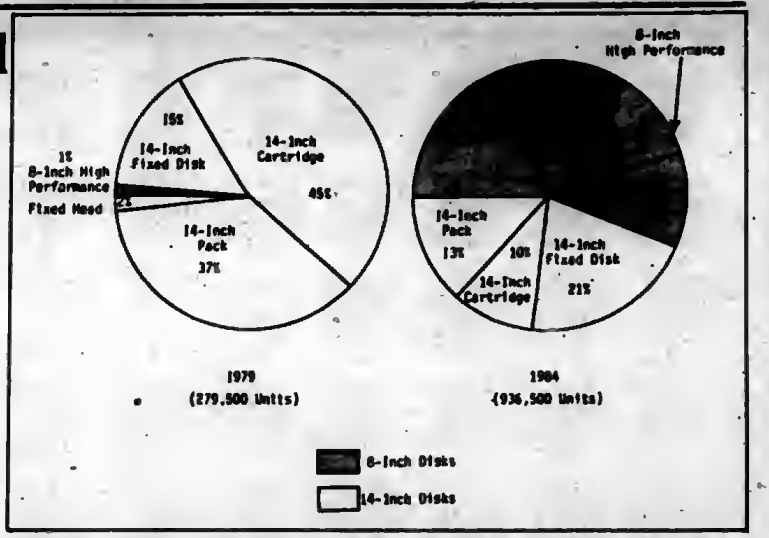
This will be particularly true for the high-performance drives, the firm said in a recent report entitled "The Hard Disk Industry: A Strategic Analysis."

However, as lower performance hard disks become available, they will be integrated rapidly into systems and should account for 40% of the marketplace by 1984, the firm said. These lower performance hard disks will primarily be used as floppy disk replacements, the firm added.

The difficulty in obtaining parts for 8-in. Winchesters to make small production runs relates to a lack of firm orders for sizable quantities of the devices while the industry plays a game of "wait and see," the firm noted.

The report compares the reception of the digital cassette and the floppy disk in the early 1970s with that accorded to the 8-in. Winchester.

"Everyone cursed the cassette, but they designed it into their equipment anyway because the need was overwhelming," VDC said. By contrast, the fixed disk drives with sealed, lubricated disks, which are commonly referred to as "Winchesters," enable the manufacturer to offer more performance than a removable disk drive, but the lack of removability is a drawback to the user, not an advantage.



These charts from Venture Development Corp. show its prediction of disk drive shipments for minicomputer-based systems. The percentages refer to share of market.

VDC believes that there will be a strong demand for the low-cost, low-performance 8-in. Winchester drives, which will replace floppy disk drives, especially in multiple floppy-disk drive systems where an 8-in. Winchester drive could take the place of one of the floppy disk drives.

The resulting storage system would then provide one drive which is low performance by hard disk standards, but would be many times superior to the floppies in storage capacity, access time and transfer rate, while the system still offers removable floppy disks for archival storage.

The rate of shipments of low-performance floppy-disk replacement drives will reach 375,000 units in 1984, which is a larger figure than all of the hard disks shipped in 1979, VDC predicted. The selling price for these drives in OEM quantities, however, will be less than $1,000, the firm added.

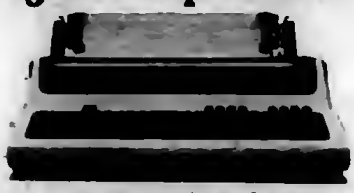
A trend toward further technological diversification of the drive industry is also forecast. At the same time that the market is growing for very low cost fixed disk drives, which compete on a "cost-per-box" basis, the larger drives will offer higher and higher densities, continuing to compete on a "cost-per-bit" basis.

Fourteen-inch fixed disk, cartridge and disk pack drives will coexist, VDC said, and 8-in. cartridge drives will be developed to compete with 8-in. fixed disk drives. Most cartridge drives will contain a fixed "Winchester"-type portion in addition to the removable cartridge.

By 1984, shipments of high-performance 8-in. fixed disks will reach a level of 54,000 units, while 8-in. cartridge drives will be selling at twice that level.

Further information regarding this report can be obtained from Edward A. Ross, senior consultant, Venture Development Corp., One Washington St., Wellesley, Mass. 02181.

Terminals now sold at Digital's Computer Stores.



DECwriter IV keyboard terminals and accessories.

LA34-$1295 cash and carry.

LA38-$1495 cash and carry.

30 CPS, switch-selectable 110 and 300 baud rates. Pressure feed or tractor feed.

Digital's Computer Stores

Atlanta: 25 Park Place N.E. Trust Company Tower (404) 523-2105

Boston: 175 Federal St. (617) 482-0900

Chicago: 206 N. Michigan Ave (312) 782-7408

Chicago: Woodfield Commons West 1037 E. Golf Rd., Schaumburg (312) 843-7857

Cleveland: 1903-5 E. 9th St (216) 241-6180

Dallas: 1625 W. Mockingbird, Suite 114 (214) 631-2520

Denver: 180 Fairmont Hotel Shopping Pavilion 595 17th St. (303) 825-5627

Detroit: 4000 Town Center, Southfield (313) 352-4780

Houston: 2 Post Oak Central 1980 South Post Oak Rd. (713) 880-0730

Long Island: Roosevelt Field 300 Garden City Plaza, Garden City (516) 741-6484

Los Angeles County: 15436 Ventura Blvd., Sherman Oaks (213) 501-5256

New Hampshire: Mall of New Hampshire, Manchester (603) 668-4005

New York Downtown: 71 Broadway (212) 363-7023

New York Midtown: 43rd St. & Madison Ave. (212) 599-0200

Orange County: 3390 Harbor Blvd., Costa Mesa (714) 540-4540

Philadelphia: 1500 Market St., Centre Sq. (215) 568-3530

Phoenix: 3800 North Central Ave. Rosenzweig Center (602) 277-4363

Pittsburgh: Kossman Bldg Forbes Ave. & Stanwix St (412) 765-2751

San Francisco: 349 Pine St. (415) 392-0281

Washington, D.C.: International Square 1850 K St., N.W. (202) 466-8426

digital

Soviet DP Cutoff Seen Easing

(Continued from Page 61)

kia.

Of more concern to the DP industry, however, is not which communist countries will be allowed to trade with U.S. firms, but which of the U.S. allies will respect the U.S. call for a mutual trade cutoff, according to Kaufman.

So far, several competitors have voiced support for the U.S. position, but only Great Britain has shown a willingness to match the trade cutoff. Germany and Japan have backed the U.S. move to a certain extent and the signals from France have been contradictory at best, he noted.

While these problems are being sorted out, the Commerce Department continues to accept license applications for technology exports, although none are being approved.

One fear of industry is that once a new export policy is instituted, increased scrutiny of applications will slow down an already lengthy approval process and further tax an already overburdened review system.

As to how long the trade restrictions will last, few are willing to speculate, since at this point the Russians do not show any sign of removing their troops from Afghanistan at an early date.

The recently enacted Export Adminstration Act curtails trade controls for foreign policy reasons, but the President still has the authority to cut off trade to protect national security. Whether or not the Carter action falls under that last heading, he will probably not be challenged to restore trade with the Soviet Union.

Although Congress is not pleased that Capitol Hill has been all but left out of Carter's decisions on trade, there is little chance Congress will challenge his move in light of its political popularity.

FREE SOFTWARE

Inventory, A/R, A/P, Payroll, P&L, Moral Written in Basic, ready to run in most computers for little more than the cost of printing. Vol. 3 - Payroll, Inv, A/R, more - $39.95; TRS-80 level 2 cassettes - $9.95. Vol. 6 - Mini Ledger for small disk computers - $49.95; TRS-80 level 2 cassettes - $9.95. Vol. 7 - Powerful - Word Processor, Med'l Billing, Chess, more - $39.95. Vol. 10 - Totally without description. It replaces "All" records & company needs, sold for years at over $10,000 - NOW $69.95. We make our profit by selling in volume. Over 118,000 in use Today. Make checks payable to KEMCO or will send C.O.D. Add $1.50 per item for Shpg. - PO Box 270278; Tampa, FL 33688, 800/ 528-6050 ext. 1184.

UNIX*

Sublicenses Leasing Development Support Time-Sharing DBMS

RLG Associates, Inc. (703) 471-6860

1760 Reston Ave. Ste. 508 Reston, VA 22090

*UNIX is a trademark of Bell Laboratories

Judge Expected to Rule Soon on EDS vs. Iran

By Susan Sanders
Special to CW

DALLAS — A United States district judge here is expected to rule within the next few weeks on a $25 million lawsuit filed by Electronic Data Systems, Inc. (EDS) against the government of Iran.

The suit was filed last March after EDS charged, the Iranian Government failed for several consecutive months to make payments on services it had contracted with EDS to provide [CW, March 12].

EDS entered into a three-year contract in November 1976 with the government of Iran, then headed by Shah Mohammad Reza Pahlavi, to install and operate DP services for Iran's national health insurance and social security system. Iran continued to make payments until June of 1978.

No Pay, No Work

Despite internal turmoil in Iran at that time, the Iranian Office of Health and Social Welfare requested that EDS continue to work on the systems without pay for a short time, according to Bill Wright, EDS director of corporate communications. The firm agreed, but by December 1978 it refused to continue any longer without payment. The contract was terminated; EDS filed its lawsuit the following March. Iranian assets were attached, assets which EDS hopes to recover through the suit.

Donald L. Case of the Dallas law firm of Jackson Walker Winstead Cantwell and Miller was the attorney representing Iran in the two-week-long hearing, which began Jan. 14 and concluded with final agruments Jan. 28.

According to Case, the main points Iran made in its defense were that the contract was procured in an illegal manner (through an intermediary) in the first place and that EDS has "not performed under the contract as it was supposed to." Consequently, the new government, under the leadership of the Aytollah Khomeini, contends that it was not obliged to continue making the payments.

The overall atmosphere of the hearing, which took place in a downtown Dallas courtroom, was subdued, Case said.

The trial was not without its moments of tension, however. The U.S. Marshal's Office was called in to provide strengthened security when two Iranian witnesses were called to testify. The extra protection, throughout was to ensure that no incidents erupted as a result of the emotional reaction some citizens have had toward Iranian citizens after 50 Americans were taken hostage at the U.S. embassy in Tehran last November.

While he never had any direct contact with the government of Iran either when preparing the case or during the hearing, Case worked through an Iranian lawyer who had communications channels with his government, an indication that Iranian officials were very much interested in the outcome of the hearing.

If EDS wins the lawsuit, it hopes to recover the assets it attached prior to President Jimmy Carter's order freezing all Iranian assets in the U.S.

If the case is decided in Iran's favor, that country may find its funds still tied up as a result of Carter's freeze order.

EDS' Wright described his firm's case as "simple and straightforward." At the heart of the matter, he said, "is just that we want our money. That's all there is to it."

Though Case contended that the matter is slightly more complex than that, he noted that it is more a business dispute than an international disagreement.

Magnuson Eyes Two Markets

(Continued from Page 61)

Another possible industry niche would be the wider marketing of the library automation system under development at the University of California at Berkeley with the help of Magnuson.

With such specialized systems, users can remain 100% compatible with IBM software, but the Magnuson machine can be tailored through the microcode to perform the specific task at hand more effectively, Hitt explained.

These new directions will make Magnuson more than just an IBM "plug-compatible" supplier, Hitt said. At the same time, it will be able to maintain its position in that market.

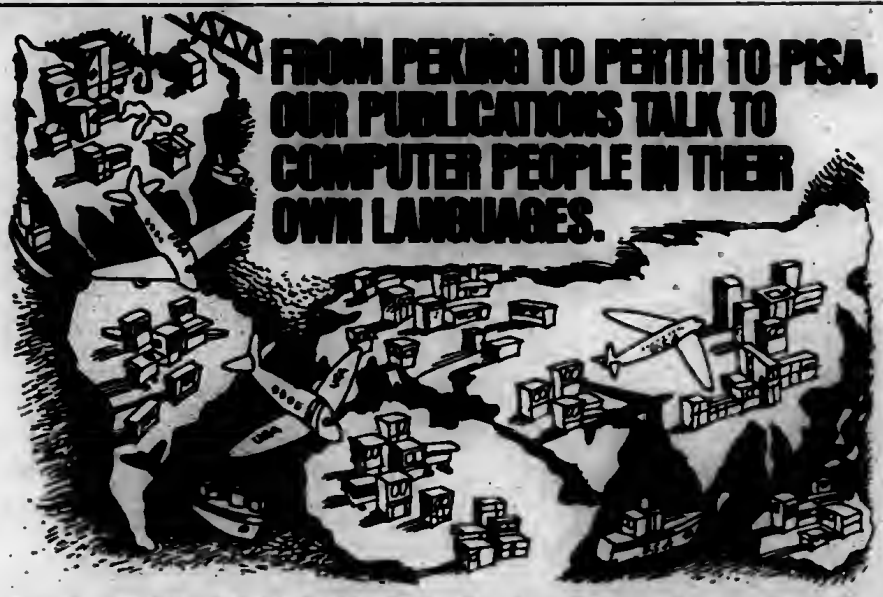
Delivery Dates

The Magnuson M80/32 will be delivered to first customers in April, he said, while the M80/42 and 43 will be delivered in September. Those two machines are Magnuson's response to IBM's 4300 series.

Hitt expects two more 4300 machines from IBM — one between the 4331 and 4341 and one above the 4341 in power. Magnuson is ready to respond to those offerings, Hitt said.

Users with delivery problems on the 4300 series are good prospects for the Magnuson units, he indicated, as are users that want to unload their large mainframes of specific tasks, such as program development.

In addition, the use of Magnuson machines as either front-end or back-end processors is a possibility, he said, theorizing that the systems could even be tailored as applications engines for specific applications.



As the world's largest publisher of computer-related newspapers and magazines, we own or provide US representation to leading local computer publications in the major computer markets of the world—those that account for the vast majority of all computers in use today (measured by value). These countries import well over $2 billion a year in US-made computer products and services, according to Commerce Department figures. And our sister publications around the world can put you in touch with the people who make the buying decisions on these imports.

Our International Marketing Services Department can give you one-stop advertising service for any or all of these publications—including translation and production services. We'll even bill you in dollars, so it's as easy as advertising in US publications.

In addition, we can help you with market facts, and, in the case of Europe, special company awareness studies. Just indicate your interests on the coupon and send it in. Or call Diana La Muraglia at (617) 879-0700.

THE MARKETS WE SERVE:

☐ The People's Republic of China China Computer Monthly is the first publication written in Chinese exclusively for the computer users in the People's Republic and allowed official distribution in that growing computer market. We provide US representation to China Computer Monthly as well as its sister publication, Asian Computer Monthly. ☐ Australia We are publishers of Australasian Computerworld, the first weekly newspaper for the Australasian computer community. ☐ Japan We are co-publishers of Shukan Computer, a weekly newspaper serving the Japanese computer market. ☐ Germany We publish the highly successful weekly newspaper Computerwoche, and a new publication for the German office automation market, TEAM. ☐ Italy We are US representatives of EDP Notizie, a bi-weekly EDP and office equipment news magazine, and Sistemi e Automazione, a monthly magazine for EDP users. ☐ France We provide US representation to Zero-Un Informatique a weekly newspaper and monthly magazine and Micro et Micros, a twice-monthly newspaper. ☐ United Kingdom We publish Computer Management, a monthly magazine for the English computer market. ☐ Canada We are US representatives for Computing Canada, a twice-monthly tabloid newspaper. ☐ Brazil We publish Datalivre a bi-weekly newspaper in Portuguese serving the fastest growing South American computer market. ☐ Argentina We are US representatives for Computadoras Y Sistemas, a monthly magazine. ☐ Chile We represent Informatica, a monthly magazine serving the Spanish-speaking computer users in its area. ☐ Holland We represent De Automatisering-gids, a weekly newspaper for the Dutch-speaking computer market. ☐ Belgium We represent Equip and Computer Age, both monthly tabloids serving the Dutch-speaking computer and office equipment market. ☐ Sweden We are US representatives for Dagens Industri, the leading industrial newspaper covering the whole of Sweden.

TO Diana La Muraglia
Manager Of International Marketing Services
CW Communications, Inc.
375 Cochituate Road, Framingham, MA 01701

Please send me rate cards and information on the following publications (countries)_____

☐ I am interested in more details on your European company awareness studies.

NAME_____
Title_____
Company_____
Address_____
City_____ State_____ Zip_____

CW COMMUNICATIONS/INC.
375 Cochituate Road, Framingham, MA 01701

position announcements | position announcements | position announcements | position announcements | position announcements

position announcements

PROGRAMMER ANALYST

Buffalo-based company has need of a skilled COBOL prog. Must be experienced in systems interface. Some applications require data terminal with Pc. based data center. Mfg. applications. $17,000. Fee Paid. Contact Pam Siegel.

Robert Half of Buffalo, Inc.
Agency
1310 Liberty Bank Building
Buffalo, NY 14202
(716) 842-0001

COMPUTER PROFESSIONALS

LIFE IS BETTER IN DALLAS!
$18,000 TO $30,000

Since 1970 we have specialized exclusively in the successful counseling, representation and career advancement of hundreds of computer professionals like yourself. Currently we have numerous opportunities for:

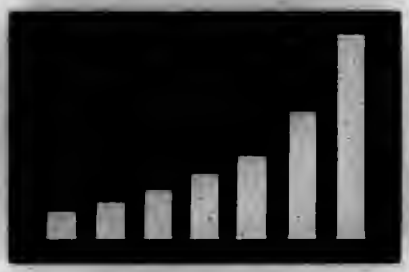
- COBOL, ALC (BAL), RPG, PL-1, FORTRAN Programmers, Programmer/Analysts
- IBM DOS, VM, OS/VS1, SVS, MVS, CICS, IMS System Programmers
- Mini Computers/Real Time Programmers
- Marketing/Marketing Support Reps

Send your resume or call us today! We know the Dallas data processing marketplace. Fees paid by client companies.

DataPro
DATA PROCESSING PERSONNEL CONSULTANTS
5580 LBJ FREEWAY – SUITE 650
DALLAS, TEXAS 75240 (214) 661 8600
Member of National Computer Assoc.

New! 1980 Computer Salary Survey

23 New Categories Reported!
Call for your FREE copy today.



Unprecedented demand and inflation have combined to cause salaries in the computer field to rise sharply in 1980. The new Source Edp 1980 Computer Salary Survey and Career Planning Guide will let you know if your compensation is keeping pace with this growth...and the strategies you can use if it's not.

This comprehensive free report also provides you expert advice on a variety of important career topics such as:

- When you should consider a job change;
- How to make sure you are getting the proper exposure;
- What steps you must take to break into management;
- How you can avoid career stagnation...and much more.

The 1980 Computer Salary Survey has been compiled by Source Edp, North America's largest recruiting firm devoted exclusively to the computer profession.

Expanded, All New Position Categories Surveyed

- The 1980 Computer Salary Survey has been expanded to provide specific data for twenty-three new categories. These include positions in data communications, mini-micro programming, data base administration, technical marketing support and EDP auditing in addition to our traditional categories of programming, software, systems design, management and computer marketing.

source edp

North America's largest recruiting firm devoted exclusively to the computer profession. Client organizations assume our charges.

Free Report!

For your free copy, simply phone the Source Edp office nearest you.

If unable to call, write
Source Edp, Department C85
721 Enterprise
Oak Brook, Illinois 60521
(When writing, please be sure to indicate home address and current position title.)

United States

Arizona	
Phoenix	602/258-6335
California	
San Francisco	415/434-3410
Palo Alto	415/856-0800
Los Angeles	213/386-6800
Van Nuys	213/781-4600
Torrance	213/540-7800
Irvine	714/833-1730
San Diego	714/231-1900
Colorado	
Denver	303/773-3700
Englewood	303/571-4450
Connecticut	
Hartford	203/522-6800
Stamford	203/375-7340
District of Columbia	
Columbia	202/446-6800
Florida	
Miami	305/624-3336
Georgia	
Atlanta Central	404/588-6000
Atlanta Suburban	404/385-6370
Illinois	
Chicago	312/782-0857
Northfield	312/446-6355
Oak Brook	312/986-0422
Rolling Meadows	312/392-0344
Indiana	
Indianapolis	317/631-6800
Louisiana	
New Orleans	504/561-6000
Maryland	
Baltimore	301/727-4060
Massachusetts	
Boston	617/482-7613
Wellesley	617/237-3130
Michigan	
Detroit	313/569-0810
Southfield	313/352-6820
Minnesota	
Minneapolis	612/544-3800
St. Paul	612/771-0544
Missouri	
St. Louis County	314/862-3800
St. Louis Downtown	314/231-4080
Kansas City	816/474-3380
New Hampshire	
Nashua	603/880-4047
New Jersey	
Cherry Hill	609/482-3800
Edison	201/494-3800
Paramus	201/845-3800
Union	201/687-6700
New York	
Midtown	212/730-7446
Wall Street Area	212/968-6000
Long Island	516/364-0800
White Plains	914/683-6300
North Carolina	
Greensboro	919/294-6800
Ohio	
Cincinnati	513/769-6080
Cleveland	216/771-8070
Oregon	
Portland	503/223-6180
Pennsylvania	
Philadelphia	215/665-1717
King of Prussia	215/265-7280
Pittsburgh	412/261-6540
Texas	
Dallas	214/387-1600
Fort Worth	817/336-6300
Houston Central	713/751-0100
Houston	
Suburban	713/688-6705
San Antonio	512/344-0217
Virginia	
McLean	703/790-0810
Washington	
Seattle	206/464-6400
Wisconsin	
Milwaukee	414/277-0345
Canada	
Toronto	416/364-2919
Don Mills	416/425-6730

ATEX is a fast growing company founded to study selected problems of the publishing industry and solve them by developing high technology systems. In six years, our PDP-11 based system has become the benchmark of the graphic arts industry. This success is a result of a team effort by people who are the best in their professions.

ATEX has an above average benefits package providing company paid health and dental insurance, life insurance, long term disability insurance, 100% tuition reimbursement and ESOP (Employee Stock Ownership Plan).

ATEX SYSTEMS, INC. ... *This new subsidiary of Atex is developing text processing and composition systems for extremely large newspapers and publishing firms.*

SR. SOFTWARE DESIGNERS Design highly complex text processing systems. Individuals must be capable of making customer presentations. MS in Computer Science or equivalent is desired. For these positions, to ensure immediate consideration on your own behalf, send your resume to Stephen E. Pitt, Director of Employment.

SR. DIAGNOSTIC PROGRAMMER Develop systems level diagnostics on PDP-11 based systems. Credentials should include BSEE or equivalent, 2-5 years' minicomputer experience, and proven capability of project implementation (including documentation).

PROGRAMMER ANALYST Develop and maintain software tools for the software design staff. Ideally, candidate should be able to thoroughly understand the design and use of Compilers, Linkers and Debuggers. Experience on PDP-11 assembly language is a plus.

SOFTWARE APPLICATIONS SPECIALISTS Install and support sophisticated text-editing systems in major U.S. cities. Test software, design software refinements and solve customer problems. Must work well in a customer environment. PDP-11 Assembly language is a plus.

To ensure immediate consideration on your own behalf, send your resume to Stephen E. Pitt, Director of Employment

atex

15 Wiggins Avenue, Bedford, MA 01730 617/275-8300
An Equal Opportunity/Affirmative Action Employer

Senior Technical Educator

If your interests lie in challenges beyond designing systems and writing programs, investigate the following opportunity with Crocker Bank. We are seeking a Senior Technician to develop and teach a variety of technical courses, develop and implement a computer-assisted instruction network, assist in the development of an Education Data Base, and systematically implement productivity, technique and software aids.

This position requires a minimum of 5 years' programming experience in an MVS/JES 2 environment; a working knowledge of COBOL, TSO, JCL, and IMS; structured programming methodologies, and good communication skills. Panvalet, Easytrieve and VSAM experience is preferred. The successful candidate should also enjoy teaching, as 40% of time will be dedicated to instruction and development of courses.

If you have been seeking the opportunity to stretch your capabilities, contact us today. Crocker Bank is proud to offer a competitive salary and excellent benefits including educational assistance and relocation expenses where necessary. Send your resume in complete confidence to: L. Blackburn, Crocker National Bank, 185 - 5th Street, San Francisco, CA 94106.

An Equal Opportunity Employer

CROCKER BANK

As a software developer at Wang, you not only get plenty of personal freedom and day-to-day responsibility—you also get the chance to design your own future.

Because nothing says you have to follow a certain path to success.

For example, if you prefer to stay strictly on the development side of the business, you can move up to be a senior contributor, working on your own or with a team of your peers. On the other hand, if you'd like to lead others, there are plenty of opportunities in technical management—where you'll supervise people and direct projects.

Either way, you never have to worry about getting trapped in a no-growth position, or stuck in a job that just isn't your style.

The point is: We think the best way for you to get ahead is *your* way.

For more information, contact Elaine Rosenberg, Wang Laboratories, Inc., Dept. C-8 One Industrial Avenue, Lowell, MA 01851. (617) 459-5000.

At Wang, you choose your own way to the top.

WANG

Making the world more productive.

© 1980 Wang Laboratories, Inc., Lowell, MA 01851 We are an affirmative action employer

Systems Software Development.

VS Operating Systems

The keystone of the Wang VS software development effort, the operating system development department has openings for experienced system programmers and software engineers in the areas of architectural specification, virtual memory management, process structuring, indexed file systems, and user and operator interfaces. Development of integrated office systems, combining word processing, interactive data processing, and a complete and highly visible spooling system is underway. Intelligent clustered device support and advanced job stream systems are being planned.

Come to an organization where individual skill and achievement is promptly rewarded by increased technical and supervisory responsibility and where each project is significant in the development of real products which receive wide commercial use.

Firmware Engineers

If working with both hardware and software state-of-the-arts technologies concurrently and making decisions of optimal tradeoffs among hardware, microprogramming and software are challenges for you, find out what our VS firmware development group has to offer. Our current efforts have resulted in the creation of our successful VS multi-processor systems and we are planning to develop more systems for the "office of the future" by exploring hardware technologies such as gate arrays, bit slice and extending microprogramming of 8 to 16 bit micro-processors to provide supports for virtual memory Operating Systems, Data Base and Networking functions. Applicants should have an advanced degree in computer science/engineering and an overview of operating systems, microprogramming and digital circuit designs.

System Programmers/ Engineers

We are looking for a number of computer firmware professionals who can contribute to our developmental efforts in building several new integrated Information Systems. We are actively investigating hardware technologies such as gate arrays, cache memories, bit slice, for high performance CPU and I/O architectures; 8-bit and 16-bit microprocessor for intelligent peripheral systems for distributed processing and microprogramming applications to provide support for Operating Systems, Data Base and Networking functions. Applicant should have an advanced technical degree and general overview of system programming, microprogramming and digital circuit designs.

We offer excellent salary and benefits including profit sharing, stock purchase plan, stock bonus plan medical and dental insurance.

position announcements | position announcements | position announcements | position announcements | position announcements

Systems Analysts/Project Managers

AT HOBART, WE'RE OFFERING YOU THE BEST OF BOTH WORLDS

You can enjoy the pleasant suburban lifestyle of Troy, Ohio and still be within a half hour drive of a growing and exciting metropolitan area.

The challenge of working in the rapidly growing, dynamic environment of Hobart Corporation can offer you the benefits of professional satisfaction and growth. Hobart Corporation, a leading manufacturer of high quality food processing and kitchen appliances, is currently looking for Project Managers and Systems Analysts who can provide the same high quality to our systems effort.

The responsibilities of the positions at Hobart encompass developing Order Processing, Distribution, Marketing and Financial Systems that have been defined in a Long Range Systems Plan. The systems development environment includes data base, data dictionary, structured methodology and a strong commitment toward training.

We've built our reputation on fine products, excellent service and top notch personnel. We can offer you a competitive starting salary, a complete package of fringe benefits and an opportunity to grow with an industry leader.

For immediate consideration, please send your resume to:

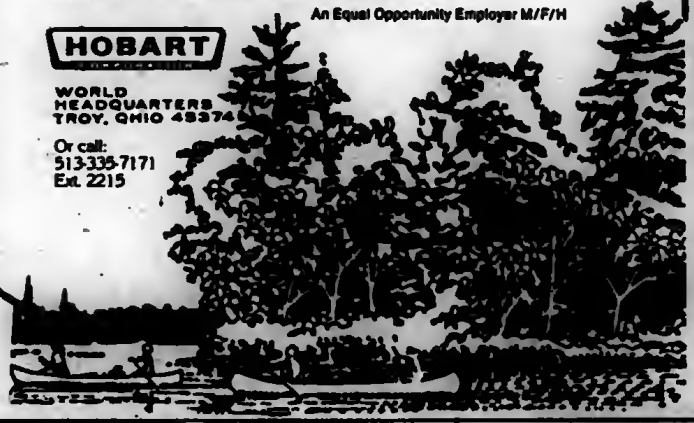
Mr. James L. Boerger
Supervisor, Professional and Technical Placement

An Equal Opportunity Employer M/F/H

HOBART

WORLD HEADQUARTERS
TROY, OHIO 45374

Or call:
513-335-7171
Ext. 2215



EXPANDING NEEDS FOR INFORMATION PROCESSING!

High-powered challenges and unprecedented career opportunities await all levels of experienced Data Processors in Standard Oil's state-of-the-art shop. The following dedicated professionals are urged to join our all-out effort as we ride the crest of new wave technology into the 80's!

Applications Programmer/Analysts
Applications Programmers
Data Base Analysts
Software Programmer/Analysts
Systems Analysts
Telecommunications Analysts
Telecommunications Engineers
EDP Auditors

If you're searching for innovation and advancement, you'll like what you find at Standard Oil. Our leading-edge environment currently includes: 3 IBM 370/168's and 2 3033's operating under OS/MVS within a JES 2 complex; Datapoint, Data General, Four-Phase, 3741, Series-1, 8100, System-34, System-3 and other mini-computers; IMS-DC, ADF, CMS, VSAM, CICS, TSO, OS/JCL, COBOL, BAL, FORTRAN, PL/1, MARK IV, BOL, GIS and INQUIRE.

In addition to outstanding salaries and benefits, we offer "hands-on" exposure to advanced development systems with IMS data bases, a complex telecommunications network and extensive in-house personalized training programs. To learn more about these exceptional career opportunities, send your resume in confidence to:

R. W. Luster

AMOCO

STANDARD OIL COMPANY (Indiana)
200 E. Randolph Dr. MC 0302
Chicago, IL 60601

Equal Opportunity Employer M/F

UNION BANK
NEW DIRECTIONS FOR THE 80's

With an eye on the future of data processing, we're providing unique challenges and top rewards for enterprising, aggressive programmers and analysts. Union Bank, highly respected in the industry and active in innovation, has immediate opportunities for:

- **INTERMEDIATE PROGRAMMER ANALYSTS**
- **SENIOR PROGRAMMER ANALYSTS**
- **SENIOR PROGRAMMER ANALYSTS/PROJECT LEADERS**

We seek exceptional candidates who thrive upon the stimulating and highly rewarding aspects of a state-of-the-art environment. Presently, that environment consists of an IBM 158 and 3032 migrating to MVS. Our installation uses TSO/FSE, and IMS in support of the development staff and our on-line network. Shop standards include top down structured design, and we utilize two languages only, COBOL and ASSEMBLER.

Excellent starting salaries, a solid fringe benefit package, full relocation benefits and the satisfaction that comes from career fulfillment await the right individual. Forward resumes with salary history in confidence, or call collect:

UNION BANK

Data Processing Division
Bill Hilliard
1000 S. Hope Street
Los Angeles, CA 90015
(213) 687-6402

Equal Opportunity Employer

MANAGER, ADVANCED SYSTEMS SOFTWARE

Boulder, Colorado

Cray Laboratories, manufacturer of the world's most powerful super computer, has created a new position in its Boulder plant for a Manager of Advanced Systems Software.

Primary responsibility will be to recruit and direct the advancement of state-of-the-art in multiprocessing operating systems software.

Candidate should have at least five years experience managing a software design and implementation group and possess a PhD in Computer Science or equivalent. The successful individual will be a self-starter, able to work relatively independently, have advanced communications skills and be able to meet deadlines.

The position will result in major contributions to the design of multi-processor software for future Cray systems.

Cray Laboratories offers a challenging work environment in a university town with year-round recreational activities and a location surrounded by the Rocky Mountains.

Outstanding salary and exceptional benefits await the qualified candidate. Please send complete resume and salary history in confidence to:

Robert C.W. Biro
Cray Laboratories, Inc.
5311 Western Avenue
Boulder, Colorado 80301

An Equal Opportunity Employer M/F

CRAY LABORATORIES INC.

WE'VE WON

COMMAND/CONTROL/COMMUNICATIONS

THIS IS WHAT IT MEANS TO YOU.

Start off the fastest route of your career as GTE Systems embarks on one of the largest C^3 Command, Control and Communications systems ever to be developed.

What you stand to gain within the new program could be the most significant opportunity for professional achievement ever available to your career...true ground floor opportunity...a multi-discipline program that offers a rotation of high-level assignments...intense involvement in a long-term effort that encompasses unparalleled growth potential. Recognize the opportunities now and move your career to GTE Systems. It's where your efforts can take on positive new meaning for the '80's.

Positions are open at all levels for systems, software, hardware and mechanical engineering professionals with the interest and ability to contribute to the major disciplines of this program:

RADIO COMMUNICATIONS SYSTEMS

The application of over 600 highly sophisticated radios in this system offers key involvement across a broad spectrum of activity. Our needs require the design and implementation of receivers, transmitters and hardened, survivable antennas--to total systems design. In all bands, VLF/LF to SHF, in anti-jam techniques and burst-resistant frequency hopping, the maximum capabilities to state-of-the-art standards will be attained.

COMPUTER CONTROLLED SYSTEMS
Software/Hardware

A hierarchy of 5,000 computers will be utilized in the base of this Command, Control and Communications system. This will involve the conceptual design and implementation of one of the largest software communications networks ever developed. The program involves systems architecture, communications protocols, computer modeling, computer-aided design and packet-switching. You will be able to employ your abilities to gain new expertise in high-level languages like JOVIAL and apply your knowledge to systems like the PDP-11.

FIBER OPTICS

GTE/Systems is the world leader in Fiber Optics. Our advancements in multiplex transmission on Fiber Optics will be utilized in the largest network of this type ever developed. Our expertise in this area helped us win the MX C^3 program, and our needs will call for Cable Systems Engineers and other engineering specialists in this uniquely sophisticated discipline. Specific activity here will encompass Frequency Multiplexing, Junctions and Transmitter-Receiver technologies.

Whether you are a seasoned professional or a recent graduate, come with us and develop new skills in creating the new technology.

Send your resume and salary history to:

Paul C. Costello
ICBM C^3 Systems Division
SYLVANIA SYSTEMS GROUP
189 "B" Street, Needham, MA 02194

THE FAST TRACK OF THE 80'S.

GTE Systems

An equal opportunity employer M/F

position announcements | position announcements | position announcements | position announcements | position announcements

E-Systems is looking for you!

We're E-Systems, a multi-million dollar international corporation that has doubled its sales in the past five years by solving some of the world's toughest problems. E-Systems Garland Division has immediate requirements for overseas assignments and in Australia.

Travel and opportunity are in your future if you qualify for these exceptional openings with the Garland Division of E-Systems. After approximately one year of working to prepare for this special assignment, you and your family will travel to Australia for a seventeen month tour. We offer excellent pay and allowances, plus the opportunity to build a tremendous future with the Garland Division.

Electronic Systems Maintenance Engineer

Requires a BSEE with three or more years of analog/digital circuit/systems design, two years systems/equipment maintenance, and hardware/software interface capability.

Software Systems Analyst

Requires a BS degree in Computer Science or Mathematics with two or more years experience on Hewlett Packard minicomputers utilizing RTE, Data General minicomputers utilizing ADS/INFOS, and proficiency in assembly language.

E-SYSTEMS
Garland Division

The Problem Solvers

An equal opportunity employer M/F, H, V

Qualified applicants send your resume to:
Staffing Manager
E-SYSTEMS, INC.
Garland Division
P.O. Box 226118
Dallas, TX 75266

CUSTOMER ENGINEERS

We're CRAY RESEARCH. A special kind of company. In an industry known for innovation, we're a pioneer. And more than that. Cray has literally become a legend in its own time.

In a few short years, Cray Research has become the leader in the large scale scientific computer industry. And we're continuing to broaden in speed and scope. A very special company seeking very special people. If you've been looking for sophisticated professional challenges, open ended opportunities and rewards to match, consider Cray Research. We just might be your company.

Select openings currently exist for Customer Engineers at key sites throughout the country. Three or more years experience on large scale computer systems is required. We will provide extensive, hands-on training on the Super Scale CRAY-1.

For immediate confidential consideration, please address resume and salary history to: C. W. McDiarmid, Personnel Department, Cray Research Inc., 1440 Northland Drive, Mendota Heights, MN 55120.

CRAY RESEARCH, INC.

An Equal Opportunity Employer M/F

A NATIONWIDE CAREER SERVICE FOR COMPUTER PROFESSIONALS

Programmer analysts, project leaders, systems programmers, IBM, Honeywell and minis.
Salaries to $30,000

No fees or contracts. Our client companies pay all expenses. Career consultation prior in any action. Over 1000 EDP positions represented nationwide.

Send your current resume (or an old one with pencil update) together with salary history and geographic preference in complete confidence to our suburban Philadelphia headquarters . . . or phone:

Systems Personnel, Inc.
Suite 0-70 P.O. Box 34
Haverford, PA 19041
215-565-2520

Systems Personnel INC

LEAD SYSTEM/ 34 PROGRAMMER

Nolan, Norton & Company, a rapidly growing consulting firm specializing in the management of data processing, now is integrating its data processing activities into the mainstream of its business operations. The firm has acquired a large IBM System/34 and now is seeking a programmer to play a leading role in developing and implementing a number of new management control system applications. System solutions must be tailored to the firm's strategy, its consulting activities and its research and library functions. RPG II, FORTRAN, BASIC, and a variety of analytical, data base, and data retrieval packages will be used intensively.

The successful candidate will be an advanced programmer with two or three years' experience with RPG II and familiarity with FORTRAN and the S/34 or equivalent computer. Previous supervisory or management experience is desirable. The position requires creativity and skills at organizing, to deal with unstructured problems, and good interpersonal skills for dealing with users. A BS in Business Administration or equivalent also is required.

NNC provides an exciting work environment, a full benefit package, and salary commensurate with experience and qualifications. Please send your resume, in confidence, to:
Ms. Barbara Oliver, Room 123.

Nolan, Norton & Company
One Farbes Road
Lexington, Massachusetts 02173
An Equal Opportunity Employer

GET AN EDP JOB ANYWHERE

CALL FREE
8-612/338-6714
CALL COLLECT

Analysts, project leaders, programmers with more than a year's experience let us help you find a better job. For a decade we have been placing EDP professionals like you all over the country through our network of 22 national offices. Send your resume or call
Electronic Systems Personnel
1716 Midwest Plaza Bldg.,
Mpls., MN 55402

client companies assume our fee.

eep
EDP Placement Specialists
A Member of National Computer Associates

MIS Opportunities

Seventeen years of phenomenal growth has made Codex Corporation the leader in Data Communications. We presently employ over 1,500 people on our 41 acre Mansfield, Massachusetts site alone.

Our success has created immediate openings for PROGRAMMER/ANALYSTS at all levels of experience to be involved with IBM 3033 and an AMDHAL V-7 under MVS. Experience with TSO, MARK IV, SPF, and IMS would be a plus.

We offer competitive salaries, full medical benefits package, 10 paid holidays, profit sharing and much more.

If you are a professional ready to move into a fully motivated company where your efforts will be recognized and rewarded, investigate MIS opportunities at Codex today!

Please send your resume including salary history, in confidence, to: J.T. Dombrowski, CODEX CORPORATION, 20 Cabot Boulevard, Mansfield, MA 02048.

codex
A Subsidiary of MOTOROLA INC.

An Equal Opportunity/Affirmative Action Employer M/F

with 3 years experience

You're Invited To

DASD's Nationwide Open House

*Denotes location of open house.
*If you can't attend an open house, please send your resume to our corporate headquarters at the address at the bottom of this ad.

ATLANTA BRANCH
*Presidential Park, Suite 126
3783 Northeast Expressway
Atlanta, GA 30340
404/455-8931
CHICAGO BRANCH
*2720 Des Plaines Ave., Suite 105
Des Plaines, IL 60018
312/699-8884
DALLAS BRANCH
*1916 Peters Rd., Suite 306
Irving, TX 75061
214/438-6315
DENVER BRANCH
*300 Inverness Way South
Englewood, CO 80112
DES MOINES BRANCH
*1930 22nd St., Suite 222
West Des Moines, IA 50265
515/223-6066
DETROIT BRANCH
*Dawn Building, Suite 525
28711 Northwestern Highway
Southfield, MI 48034
313/352-6830
FLORIDA BRANCH
Executive Square Office Park
408 Rao St., Suite 140
*Tampa, FL 33609
813/876-3130
*Hollywood, FL
2514 Hollywood Blvd., Suite 404
305/922-2775
*Orlando, FL
Gold Key Inn
7100 S. Orange Blossom Trail
HARTFORD BRANCH
*One Financial Plaza
Hartford, CT 06103
203/727-6737
HOUSTON BRANCH
*2550 North Loop West, Suite 712
Houston, TX 77092
713/681-1401
INDIANAPOLIS BRANCH
4740 Kingsway Dr., Suite 324
Indianapolis, IN 46205
317/254-1201
*Marriott Inn
7302 East 21st Street
Indianapolis, IN
KANSAS CITY BRANCH
*10820 West 64th Street
Shawnee, KS 66203
913/631-4300
LOS ANGELES BRANCH
*22010 S. Wilmington Ave.
Suites 101-102
Carson, CA 90745
213/835-3273
MILWAUKEE BRANCH
*9045 North Deerwood Drive
Milwaukee, WI 53223
414/355-3405
MINNEAPOLIS BRANCH
*10800 Lyndale Avenue South
Suite 220
Bloomington, MN 55420
612/881-4733
OMAHA BRANCH
*11128 John Galt Blvd., Suite 505
Omaha, NE 68137
402/331-3750
PHILADELPHIA BRANCH
*Whitepain Office Campus
1730 Walton Road
Blue Bell, PA 19422
215/628-7050
PORTLAND BRANCH
*200 S.W. Market St., Suite 951
Portland, OR 97201
503/224-7628
SAN FRANCISCO BRANCH
*1633 Bayshore Hwy., Suite 237
Burlingame, CA 94010
415/692-6050
SEATTLE BRANCH
*33427 Pacific Hwy. South
Suites H & I
Federal Way, WA 98003
206/838-3600
WASHINGTON D.C./
BALTIMORE BRANCH
The Clark Building, Suite 322
5565 Sterrett Place
Columbia, MD 21044
301/596-0080 (Washington)
301/730-2002 (Baltimore)
*Baltimore, MD
Baltimore Hilton
1726 Reisterstown Road
*Bethesda, MD
Bethesda Marriott
Pooks Hill Road
*Richmond, VA
Holiday Inn Downtown
301 West Franklin

ADDITIONAL OPEN HOUSE LOCATIONS:
ST. LOUIS, MO
*Ramada West
12031 Lackland Road
BOSTON, MA
*Marriott Hotel
3345 Commonwealth Avenue
Newton, MA
203/727-6737
NEWARK, NJ
*Sheraton Inn
Newark Airport
901 Spring Street
Elizabeth, NJ
201/355-0555
PITTSBURGH, PA
*Pittsburgh Marriott
101 Marriott Drive
Pittsburgh, PA
215/348-1510

An Equal Opportunity Employer

Monday, February 25th, 5:30-7:30 p.m.

Join us in a relaxed atmosphere at the office nearest you and get to know us firsthand. Talk to others, like yourself, who have become a part of the DASD team. Ask questions. Compare variety. Challenge. Benefits. It's a great opportunity to find out about a great opportunity. For you.

WHO IS DASD?

DASD is a well-established data processing service organization with offices in major cities throughout the United States. Our people are the best in the industry, who take pride in doing the best job possible. On the job we'll undertake full project responsibility. Or work side by side with a client's own staff. Either way, offering you varied experience, challenge, new faces, a chance to learn ... and to expand on learning.

Our dramatic growth is a reflection of our professional, common sense approach. Which gives you an unequalled opportunity to grow to your own potential. Our impressive track record and many satisfied clients, including many Fortune 500 companies, are the result of highly qualified, talented individuals. Like you. Colleagues who have joined their abilities to create an organization that's unsurpassable as a whole.

Come work with us. You'll like who we are. And the job opportunities waiting for you.

WHAT DOES DASD OFFER YOU?

- Security With Variety—the opportunity to build job tenure, yet still work with a variety of computers and languages in a variety of computer environments. Plus, upon hiring DASD is open to relocation requests. And with offices all over the U.S., the possibilities are far reaching.
- Challenge—with each new job a new challenge, and the chance to be recognized for your unique contribution.
- Training—we offer the educational updating needed to stay current in fast-changing computer technology, providing broad experience and a good background for moving up in our fast growing company.
- Benefits—higher than average salary, paid overtime, paid holidays and vacations, comprehensive health and dental care, life and disability insurance.

Don't miss this great opportunity to find out about a great opportunity. For you.

DASD

DASD Corporation/Corporate Services Center
Dept. CW01/9045 North Deerwood Drive
Milwaukee, WI 53223/(414) 355-3405

position announcements | position announcements | position announcements | position announcements | position announcements

TAKE A BOLD STEP....

EXPERIENCE CAREER ADVANCEMENT IN ATLANTA!

Systems Programmer

...Develop Systems Software In The Sunbelt!

Our Energy Management Division has an exciting career opening for a talented Systems Programmer at our headquarters in suburban Atlanta. You will be involved in the installation and support of systems software to create a data base/data communications environment with CICS, IMS and SNA. You should have two years of experience in systems programming, IBM OS/VS1 and CICS experience is preferred. To get the type of talent we need for this opening, we will pay all relocation expenses to Atlanta, the Queen City of the Sunbelt.

In addition, we offer an excellent salary, complete company benefits, and plenty of potential for professional advancement. For prompt consideration, please send your resume or a letter outlining your education and experience to:

Mary Foti

SANGAMO WESTON, INC.
Energy Management Division
Post Office Box 46400
Atlanta, Georgia 30362

An Equal Opportunity Employer M/F

SANGAMO WESTON
Schlumberger

MASSACHUSETTS

CONNECTICUT
•Wethersfield

Concerned with People, Service and the Environment

NORTHEAST UTILITIES

is

Paying for Motivated Computer Professionals with Large Systems Experience (IBM 370/3033 - 168)

- Data Base (IMS-DL/1) - 34-38K
- Analyst Programmers - 19-23K
- Systems Programmers - 19-23K
- CIP Trainer - 19-23K
- Quality Assurance Analyst - 19-23K

We offer excellent benefits, salary and growth opportunities. Please forward an up-to-date resume or call:
Ms. Linda Haldane

NORTHEAST UTILITIES
P.O. Box 270, Hartford, CT. 06101
(203) 666-6911

NU

An Affirmative Action, Equal Opportunity Employer

Experienced Programmers and Analysts

Send resumes to: Mark C. Grove, Recruiting Office, Ætna Life & Casualty, 79 Farmington Avenue, Hartford, CT 06156 (203) 273-6828. An equal opportunity employer.

Ætna
LIFE & CASUALTY

GROW SOUTH. . .
Career Opportunities

Headquartered among top 10 growth markets in America with a Southern lifestyle and metropolitan cultural advantages.

WILSON is the South's leading catalog showroom merchandiser with stores from Colorado to Florida. Current planned expansion is creating excellent career opportunities for qualified data processing professionals at its corporate headquarters in **Baton Rouge, Louisiana.**

SENIOR SYSTEMS ANALYST
Responsible for technical and managerials. Development of systems on to large-scale computers with high level visibility.

SYSTEMS ANALYST
Responsible for design and implementation of large and complex systems. Retail, financial/manufacturing or inventory experience a plus.

PROGRAMMER/ANALYST
Responsible for the programming, implementation and maintenance of large and complex systems. 1-5 years experience on COBOL.

TELECOMMUNICATIONS DATA BASE

These opportunities offer professional growth and a comprehensive compensation program.

CALL COLLECT

(504) 926-1733, Ext. 1200

H.J. WILSON CO., INC.
5825 Florida Blvd. • P.O. Box 66221
Baton Rouge, Louisiana 70896

MGR. SYS. ENG'G.

Vermont apply, for indiv. with EE bkgrd. to direct staff in Digital/Analog "mini" dev., config. and planning. Excellent rural unstructured yet professional environment. $35,000. (Fee Paid.) Contact Stan Durbas.

Robert Half of Hartford
Agency
111 Pearl St.
Hartford, Conn. 06103
(203) 278-7170

Systems Programmers To $33K

A world wide manufacturer and distributor is looking for an IMS Systems Programmer to support IMS and its related software packages on a large IBM 370 mainframe. Will be responsible for the definition of procedures, the performance measurement and tuning, and the overall control of the IMS region. A minimum of 5 years in data processing is required, with a thorough understanding of IMS internals and experience with the IMS DB/DC.

We are consultants to management. For confidential consideration, please send resume and salary history to Don Perkins, Professionals for Computing, Inc., One Maritime Plaza, Suite 1300, San Francisco, CA 94111. (415) 986-7120. Employer assumes fee.

professionals for computing, inc.

SYSTEMS PROGRAMMER

Husky Oil, a fully integrated independent oil company, has an immediate opening in its Cody, Wyoming office for a Systems Programmer with 2-5 years experience. Exposure to OS/VS1, MVS and a major DBMS desired.

If your lifestyle could include a small city in the Rocky Mountain West, please send your resume and salary history to:

C. Ed. Hall
Manager, Human Resources

Husky Oil Company
P.O. Box 380
Cody, Wyoming 82414

Husky

An Equal Opportunity Employer M/F

position announcements | position announcements | position announcements | position announcements | position announcements

PROGRAMMER/ANALYST
Jr. up to Sr.
Up to $24,000 to start

Excellent opportunity to join a progressive FORTUNE 500 COMPANY in sunny Florida and to participate in their expansion. To qualify you need a degree or equivalent experience, IBM 370, DE, COBOL, Assembler, and some CICS. Outstanding benefits include Major Medical, Life, Educational assistance, Retirement, Scholarship Fund and Liberal Vacation Policy. If you have the enthusiasm and desire to achieve your potential, you owe it to yourself to explore this opportunity.

PROJECT LEADER
Up to $28,000 to start

An outstanding opportunity exists for a person who has the following specifications: IBM 370, OS, COBOL, CICS, IMS, or TOTAL data base. You must currently be a Sr. Programmer/Analyst or Systems/Analyst with people responsibility and the ability to complete and implement projects from start to finish. Heavy knowledge of user and requirements in a general business environment a must. Degree preferred, will consider equivalent experiences. Excellent benefit package and full relocation.

For either position, call collect or send resume to strict confidence to Bob Beck

Hayden-Mitchell Associates
[illegible]
Pompano Beach, Fla. [illegible]
[illegible] Mon-Fri 8-5

Service charge assumed by client company

MGR. TECH SERVICES

Leading Boston-based distribution service co. seeks top sys. software mgr. to direct support group. IMS, OS/VS, MVS, CICS Mgmt. pref. Will also manage, coordinate and budget. Unlimited career opp. for strong tech. mgr. Salary $37,000 range. (Fee Paid.) Contact Gerry Battista.

Robert Half of Boston
Agency
100 Summer Street
Boston, MA 02110
(617) 423-1200

DIRECTOR - INFORMATION SYSTEMS

Expanding national real estate developer, builder and property manager is seeking an experienced systems analyst to fill a newly created position responsible for the development of a computer-based management information system. Reporting to the Sr. Vice President-Administration/Corporate Controller, the successful candidate will have essential top management support to exercise leadership and initiative in the design, development, implementation and operation of the data base/integrated system desired to support continued growth in the 1980's.

Preferred background includes a degree in the Computer Sciences or Mathematics with a minimum of seven years experience, knowledge of financial information systems and at least two years in a managerial/supervisory capacity. Salary $[illegible] - $[illegible], plus incentive. Send resume to: Mr. Schmidt, Oxford Development Corp., [illegible] Drive, Indianapolis, Indiana, 46[illegible].

an equal opportunity employer

At E-Systems in Dallas, we solve some of the world's toughest problems.

The Garland Division of E-Systems in Dallas specializes in the development and delivery of high-technology electronics. Our long-range programs involve many of the world's toughest one-of-a-kind problems. Problems that require some of the world's most advanced technological solutions.

We need career-minded people who are problem solvers...Software, Electronic and Mechanical Engineers plus R&D Technicians in these programs:

- *High* speed logic design
- Special purpose digital processing
- Analog and synthesizer design
- Electronic reconnaissance
- Passive electronic warfare
- Product software embedded in electronic systems on IBM-370, Perkin-Elmer 3220, HP-21 MX, and microprocessors
- Communication and data-base management systems on DEC and TANDEM
- Advanced digital communications
- Audio/digital voice processors
- Command and control systems

If you want to make problem solving your career, send this coupon to: Employment Manager, E-Systems, Inc., Garland Division, P.O. Box 226118, Dallas, Texas 75266. Or call COLLECT (214) 272-0515.

E-SYSTEMS
Garland Division

The problem solvers.

An equal opportunity employer M/F, H/V

☐ Please send more information about E-Systems Garland Division.
☐ Please have Employment Manager call.

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE _____

PACIFIC NORTHWEST

Are you interested in pursuing a rewarding career in a stimulating work environment while enjoying the casual Pacific Northwest life style?

Washington Public Power Supply System is seeking computer professionals with two or more years experience. Successful candidates will have the opportunity to develop information systems on IBM 3033 hardware and prime 750 computers utilizing COBOL and Database Management languages.

This exciting opportunity comes complete with competitive salary, benefit package and relocation assistance.

For consideration, contact Juan Aguilar at (800) 541-6713 or send resume and salary history in confidence to: J.J. Aguilar, DEPT. K-80, Washington Public Power Supply System, P.O. Box 968, Richland, WA 99352. An affirmative action employer.

WPPSS

EDP OPPORTUNITIES

HP 3000 Fortran SPL Image	$29K
Policy & Proced anal-dog	$30K
Software MVS VS1 SVS CICS 3507	$37-39K
Software JES II VTAM NCP CICS	$36K
Bio Medical Realtime on line DEC 11 RSX 11 Fortran	$36K
Computer OP PDP1170 AIMS	$13-15K
Software MVS CICS	$39K
Mgr Software MVS CICS TCAM	$45K
HP 300 Cobol Image Query	$27K
Programmer CICS Cobol On Line	$29-31K
Programmer Fortran ALP CMS Fmd MA	$31K
Data Base Analyst-Adabase	$31K
PDP 11-VAX Basic + ALP Cobol Fortran	$29K
Systems Mgr L.I product support	$38K
Proj Mgr DOS VS CICS in patient/out patient	$33K
Software JES II MVS 3705 NCP 5	$38K
Database ADM L.I DOS VS E CICS DL I	$35-37K
Software L.I -DOS VSE CICS DL I	$35-37K
Proj Ldr L.I Credit card PL 1 Cobol	$33-35K
Proj LDR Wang Payroll DOS VS CICS PL1	$30K
Fmcl Prog-WANG 2300 Mod VS Cobol	$27K
Prog-Finance PDP 1170 RSTS Basic	$25K
Proj Mgmt L.I OS Cobol dog	$36-37K
BIZ Systems Analyst planning devel	$38K
Software-network job entry internals MVS	$35K
Proj Ldr NJ HP 3000 Image Query financial systems	$29-31K

Call [illegible]
(212) 345-3910

WM HARRIS ASSOCIATES
150 Broadway NY NY 10038 agency

EDP MANAGER

Northeastern Ohio manufacturer needs a Manager to enhance the activities of our rapidly expanding Datapoint ARC system. We are looking for an independent, innovator experienced with our type of equipment or other on-line minicomputer system.

The successful candidate will have a minimum of 5 years experience in the discipline, some of which will be administrative and must also have a proven record of manufacturing control systems design and installation in a variety of manufacturing environments.

Come grow with us. Send your resume with salary requirement to:

John Fisher
Manager Industrial Relations
EMCO WHEATON INC.
Chamberlain Boulevard
Cornwall, Ohio 44030

Emco Wheaton Inc

EMCO Wheaton

We Are An Equal Opportunity Employer M/F

position announcements | position announcements | position announcements | position announcements | position announcements

SENIOR DP CONSULTANT

Develop top educational programs for our Information Systems Department and advancement in our Fortune 100 company is assured.

We are a rapidly growing multinational organization with an exceptional career opportunity at our upper Midwest corporate headquarters. It is a senior staff position with broad scope and considerable visibility to corporate and divisional management.

In brief, you'll be developing and implementing educational programs in support of Management Information Systems. These include: Systems Development Methodologies, Project Management, Structured Design and Programming, EDP Planning, Systems Integrity and Theory, and Computer Aided Education. You'll also have an opportunity to develop your own curriculum.

Your credentials should include at least 5 years of DP teaching, writing and consulting experience, superior interpersonal skills, and knowledge of workshops, lectures, case studies, national conferences, and other variants of the educational process.

The position offers a starting salary in the mid-thirties, top benefits, and ample opportunity for recognition and continued career growth. Learn more by sending confidential resume and salary history to:

CW Box 2212
375 Cochituate Rd., Rte. 30
Framingham, Ma 01701

An equal opportunity employer, m/f

DATA PROCESSING CAREERS

If you must work hard, why not do it for yourself?

Join our organization and turn your DP expertise into financial security!

If you're people, marketing, and results oriented, you may qualify to become part of our national personnel consultant organization in your area. Current offices in Dallas, Fort Worth, Houston, Tulsa and Kansas City.

You should have

- the desire for more income
- 5 - 20 years in DP
- long-term residency in your area and be active in local groups such as ASM, DPMA or ACM
- prior recruiting/interviewing/hiring experience
- good vendor experience
- financial stability and the desire to own and operate your own business
- solid personal background with a willingness to invest in yourself
- professionalism permitted

If the above describes you, then let us know more about yourself with a letter, resume or by calling:

Ron Mangin, Vice President
Corporate Development
DPC-Kansas City
6405 Metcalf, Suite 202
Shawnee Mission, Ks. 66202
(913) 381-6600

DATA PROCESSING CAREERS
Personnel Consultants

FLORIDA INTERNATIONAL UNIVERSITY

SYSTEMS COORDINATOR for USER SERVICES

The Southeast Regional Data Center (SERDAC), located at Florida International University, will accept applications for the following two positions until March 17, 1980. Minimum educational requirements for both positions are Master's degree and three years experience, or bachelor's degree with extensive relevant experience. Additional qualifications include

1) Systems analyst, COBOL, Data Base Management Systems, UNIVAC 1100 experience highly desirable. Good written and verbal communications skills necessary

2) Scientific or statistical computing experience: FORTRAN, BASIC, COBOL a plus. User Services in an educational institution desirable.

SERDAC Operates a UNIVAC 1100/81, and is a member of the State University System Computer Network, providing computer support to public and private higher education in S U N N Y Florida. Salary to $19,750, annually

Address replies to:
Office of Personnel Relations
Florida International University
Tamiami Campus
Miami, Florida 33199.

AN EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER
A MEMBER OF THE STATE UNIVERSITY SYSTEM OF FLORIDA

Take the shuffle out of the search. Subscribe to the Computerworld Index.

[For details, call or write our Circulation Department]

COMPUTERWORLD

CORPORATE SYSTEMS AND PROGRAMMING MANAGER

SUBURBS LOCATION
SALARY RANGE: UPPER 040's

Fortune 200 firm has an immediate opening for a highly motivated, seasoned professional. Responsibilities for this newly-created position include the direction of an overall implementation of major systems within the oil and gas industry firm.

The individual we seek will have total management responsibility for a large staff of MIS professionals.

We offer excellent benefits along with the opportunity to enjoy year-round outdoor recreation. Send your resume in confidence to:

CW Box 2214
375 Cochituate Rd., Rte. 30
Framingham, Ma. 01701

Our Client is an Equal Opportunity Employer M/F/H

data processing

PROGRAMMER/ANALYST

Miller Offers Great Potential in A State-of-the-Art Data Center

We're America's fastest growing major brewer. As we grow, we expand. Since we hire the most talented people we can find, it's easy to have a strong promote-from-within policy. If you qualify, you may be able to join our state-of-the-art environment and grow with us.

You'll develop plant programs and/or revise existing systems as you work directly with our MIS Manager developing new plant management systems. Your responsibilities will also include training and the preparation of training materials for external MIS use and for other departments. 2 or more years plant systems programming experience with COBOL and OS/MVS/JCL familiarity, knowledge of accounting, PL/1 and basic programming language, and good communication skills are required. A college background would be helpful.

We'd like to talk to you if you have the qualifications for this position. We'll tell you more about the excellent salary and complete benefits we can offer. Send a letter telling us about yourself and your experience to: Bill Mercerio, Dept. 6500-0, Miller Brewing Company, 6233 N. Irwindale Ave., Azusa, CA 91702.

Miller

Success... It's a Matter of People

An Equal Opportunity Employer M/F/H

A Public Service of This Magazine & The Advertising Council

AMERICAN RED CROSS VOLUNTEER

Your Business can be one, too.

Red Cross needs individual volunteers, and donors of blood and money, by the millions.

But we need even more help. We need the solid support of American Business. And we never needed it more.

If your business is already helping, by organizing blood drives, and by supporting payroll deductions—either directly for the Red Cross, or through the local combined fund drive—the whole community owes you thanks. And we thank you, too.

Last year, with help from our friends, we offered major aid at over 30,000 disasters—from typhoons, to local (but just as devastating) house fires.

We were able to help the elderly with practical programs, we helped veterans by the hundreds of thousands, we taught people by the millions to swim or swim better. And that's just the tip of the iceberg.

Think of America without The American Red Cross.

And you'll know why we need your business as a Red Cross Volunteer. In your community. And all across America. Contact your local Red Cross Chapter to see how your company can become a volunteer.

Red Cross is counting on you.

position announcements | position announcements | position announcements | position announcements | position announcements

CompuSearch

Our career is finding one for you.

When your're ready, we are: CompuSearch, a division of Management Recruiters International, specializes in the placement of EDP and related industry personnel. In 1978, we placed 27,000 people. What sets us apart? Our people. Professionals. Talk with them about your aspirations. They'll put their minds to it. Better yet, find a better position for you. Phone our office. There's nothing to lose, but a lot to gain. Like a better life.

Albany, NY	518/459-5713
Ann Arbor, MI	313/769-1720
Appleton, WI	414/731-5521
Arlington, TX	817/460-5401
Atlanta-Northwest, GA	404/955-2705
Baton Rouge, LA	504/927-4700
Bowie, MD	617/262-5800
Bucks-Co (Phila area), PA	215/757-1640
Cedar Rapids, IA	319/393-5441
Cincinnati, OH	513/651-6000
Clearwater, FL	813/726-1551
Cleveland, OH	216/526-1697
Cleveland-West, OH	216/221-4700
Columbia, MD	301/995-1240
Columbia, SC	803/779-5777
Columbus, OH	614/459-7500
Dallas, TX	214/750-0503
Dayton, OH	513/220-5271
Farmington (Detroit), MI	313/355-5000
Frederick, MD	301/694-4999
Greenbelt, MD	301/220-5001
Houston, TX	713/659-5000
Indianapolis, IN	317/257-4500
Kalamazoo, MI	616/381-1700
Lancaster, PA	717/239-2911
Lansing, MI	517/694-1100
Louisville, KY	502/239-5000
Lynchburg, VA	804/528-1000
Los Angeles, CA	213/553-1313
Louisville, KY	502/459-4000
Memphis, TN	901/761-5000
Miami/Coral Gables, FL	305/445-1000
Miami-North, FL	305/576-5000
Milwaukee, WI	414/272-4000
Milwaukee-North, WI	414/351-3000
Morristown, NJ	201/267-3000
Omaha, NE	402/397-5115
Pittsburgh-South, PA	412/562-5000
Richmond, VA	804/355-5971
Rochester, NY	716/325-1000
San Francisco, CA	415/398-5911
Scottsdale, AZ	602/941-1040
Seattle, WA	206/762-7000
Seattle-East, WA	206/776-5000
Southfield (Detroit), MI	313/559-2000
Syracuse, NY	315/471-7101
Topeka, KS	913/233-0410
Troy (Detroit), MI	313/528-4300
Tulsa, OK	918/622-4000
Wichita, KS	316/681-3000
Youngstown, OH	216/782-8917

CompuSearch®
DIVISION OF MANAGEMENT RECRUITERS

Teach us a thing or two.

You know things we don't know.

Okay, so we're the leader in MOS and bipolar VLSI circuitry, sonar, spread-spectrum TDMA digital communication, electronically quiet radar, and much more.

Still, we need your experience and skills to stay in front.

Sure, we're the world's foremost developer of high-technology data display consoles.

Nevertheless, we want people who can figure out how to make them better.

Here at Hughes Ground Systems in a quiet part of Southern California's Orange County, we have perhaps the best undersea lab in the world.

But it is the individual engineer and scientist that makes it best, and keeps us ahead of the pack.

In this company, with management by and for engineers, risk-taking is supported, not frowned on.

So if you're a venturesome electronic engineer, computer science graduate, mechanical engineer, mathematician, or physicist, we'll give you all possible recognition and reward.

If you want to continue your education, we'll work out an agreeable work-study schedule and pay the bills. We know our success is built on the achievements of highly trained members of our technical staff.

The more you learn, the more we learn from you.

Make us a job offer.

Think about bringing your training and expertise to Hughes, the company with 1,500 high-technology projects to work on—a four-billion-dollar backlog that adds up to both variety and security.

What's more, we have in our midst some of the foremost scientists in dozens of different fields.

Working with them, all of us can learn a thing or two. Every day.

The first step is a simple one. Send your resume to:

Hughes Aircraft Company

Ground Systems Group
Professional Employment Dept. WC-2
1901 W. Malvern Ave.
Fullerton, CA 92634

HUGHES
HUGHES AIRCRAFT COMPANY
GROUND SYSTEMS
U.S. citizenship required
Equal Opportunity M/F/H/C Employer

National Opportunities

Mid-Senior Level Technical Contributors and Project Leaders, interested in career advancement.

- Applications
- Systems Software
- Software Development in Mini/Micro and Large-Scale Technologies

Contact Michael O'Keefe. Call Collect (617) 273-1740 or submit resume. Available Monday and Wednesday evenings until 8 PM (EST).

Management Advisory Services Inc.

"The Recruiting Firm for the Computer Professional"
18 New England Executive Park, Suite 2600, Burlington, MA 01803.

Clients assume all fees and relocation expenses.
Executive search and placement consultants, representing equal opportunity employers.

REYNOLDS ELECTRICAL & ENGINEERING CO., INC., HAS IMMEDIATE JOB OPPORTUNITIES AVAILABLE IN LAS VEGAS, NEVADA. RELOCATE TO LAS VEGAS IN SOUTHERN NEVADA WHERE THE CLIMATE IS BETTER, AND YEAR ROUND SPORTING ACTIVITIES ARE AVAILABLE. TAXES ARE LOWER (NO STATE INCOME TAX) AND THE LIFE STYLE IS YOUR STYLE.

COMPUTER PROGRAMMER/ANALYSTS

We have business and technical applications opportunities for Programmer/Analysts who have any combination of training and experience equivalent to a degree in Business Administration, Mathematics, Accounting, Computer Science or related fields plus 2 to 5 years experience with COBOL and/or FORTRAN in large timesharing systems.

Must be a U.S. citizen. Replies held confidential. Liberal fringe benefits.

EQUAL OPPORTUNITY EMPLOYER — M/F

Send resumes to:

Ms. Trudie L. Rainey, M/S 567
Reynolds Electrical & Engineering Co., Inc.
P.O. Box 14400
Las Vegas, NV 89114

REECo

position announcements | position announcements | position announcements | position announcements | position announcements

DIRECTOR SYSTEMS/HARDWARE TECHNOLOGY

Manufacturing Data Systems, Incorporated . . . recognized as a leader in providing state-of-the-art computer technology to industry . . . seeks an experienced professional to develop a Systems and Technology function which will serve as the corporate focal point for applied hardware and systems technology. Challenges include vertical integration of present and future MDSI products and systems, identification of target hardware systems supporting multiple MDSI software products, and evaluating new R & D ventures for technical and economic feasibility.

Qualified candidates will have experience as manager of a complex computer system design project requiring a background in both minicomputer and large-scale computer systems design. An M.S. Degree in Computer Science or Electrical Engineering and a demonstrated ability to make well-informed technical and management decisions are prerequisites.

Attractively located in Ann Arbor, Michigan — a major university community — MDSI offers unparalleled professional and growth opportunities, competitive salaries, and an excellent benefit package including bonus and stock option eligibility.

Interested candidates should send their resume or call collect:

George M. Peterman
Manager-Corporate Employment
(313) 995-6032

Manufacturing Data Systems Incorporated
4251 Plymouth Rd.
P.O. Box 986
Ann Arbor, MI 48106

MDSI

We Are An Equal Opportunity Employer M/F

COMPUTER PROFESSIONALS

SEATTLE/PORTLAND

Senior Consultant ..... to $[illegible]
IMS Data Base, prior expr., degree, travel

Operations Manager ..... to $[illegible]
Large multivendor operations facility

Communications Software Specialist ..... to $[illegible]
Honeywell (GRTS, RPS) or IBM (TSO, RJE, BISYNC)

Graphics Software Specialist ..... to $[illegible]
Broad expr., TEKTRONIX/other hardware/software

Data Base Software Specialist ..... to $[illegible]
Honeywell (IDS II, DM IV) or IBM (IMS, IDMS, TOTAL)

Systems Programmer ..... to $[illegible]
IBM (OS/VS1; MVS, JES2); Honeywell (GCOS)

Transportation Program Manager ..... to $[illegible]
Marine transportation project mgr.

Computer Performance Analyst ..... to $[illegible]
IBM hardware/software monitors

Systems & Programming Manager ..... to $[illegible]
Health Care experience, degree required

Training Manager ..... to $[illegible]
Establish/maintain in-house EDP training

Systems Manager ..... to $[illegible]
5 years financial appr. (A/R, A/P, & G/L)

Contracts Administrator ..... to $[illegible]
Hardware/software expr., vendor contact, RFP prep.

Project Leader ..... to $[illegible]
Install DDA, banking applications, COBOL, BAL

Project Leader ..... to $[illegible]
Implement CPCS

Mini Computer Analyst ..... to $[illegible]
HP 3000, Microdata or II Level 6

Programmer Analyst ..... to $[illegible]
Manufacturing, distribution, order entry, COBOL

Programmer Analyst ..... to $[illegible]
Utility, PL1, OS

HOUSER, MARTIN, MORRIS & ASSOC.
[illegible] North East, Suite A
Bellevue, WA 98004
(206) 453-3700 24 Hour Service

We are a member firm of National Computer Associates with 32 offices Nationwide to assist you or finding a position.

SYSTEMS SPECIALISTS

The challenge you want
The recognition you need
The rewards you deserve

It all comes together at Murray Rubber, dynamic, growing Heston-based arm of Mead, a Fortune 150 corporation. The stage is set for application of your range of capabilities; for demonstrating your technical and innovative grasp in close work with other professionals and internal departments; and for expansion of skills into new and diversified areas.

BUSINESS SYSTEMS

Upgrade PDP 11/40 to PDP 11/70 and enhance related software with manufacturing and financial modules to support multiple manufacturing facilities in an on-line environment. Responsibilities include systems implementation, generation, optimization, user training and establishing in-house back-up capabilities. BS in Computer Science, Business Administration or related discipline essential plus a minimum of 3 years information service experience including financial and manufacturing systems. Strong MRP background required with DEC/RSTS preferred. Capability for running major training program a decided asset.

DATA COMMUNICATIONS SYSTEMS

Key position supports evaluation, development, installation, maintenance of telecommunications equipment/facilities interfacing with computer operating systems. Works with user groups to define requirements; then design, develop, and implement their software solutions. Initial payroll systems involvement expands to include manufacturing and financial systems. BS in Computer Science or related discipline required. 2 years information service experience and manufacturing or financial systems background desirable. Experience in PDP-11 and RSTS/E preferred.

We offer excellent salaries, fully ranged benefits, and obvious prospects for growth in a setting of advancing sophistication. For prompt, confidential consideration, send resume to: Director of Human Resources.

MurrayRubber
a Mead Company
[illegible] Langfield, Houston, TX 77040
An Equal Opportunity Employer M/F

Senior Systems Analysts

NASHVILLE, TN

Ground floor opportunities are now available with a Fortune 100 industrial company locating to the Nashville, Tn. area in the near future.

Qualified candidates should have 3+ years systems implementation background, as well as some project management. Knowledge of mini computers and prior experience as a programmer is preferred.

These ground floor opportunities will provide significant visibility and career growth potential based on the planned growth of our new operation in conjunction with the internal promotion practices of our organization.

We offer an excellent starting salary, along with an outstanding company benefits program including relocation reimbursement.

Please send resume with salary history and requirements to:

Box CW 836
610 7th Ave., NYC, NY 10019
An Equal Opportunity Employer M/F

DP MGR MAINE

Lovely surroundings and a conservative life style highlite this outstanding opportunity with well known textile firm located in MAINE. 3+ years RPG or COBOL and SYSTEM 3, 34 or 370 with management experience. Manage conversion to 4331 from currently installed SYSTEM 34. Excellent growth potential within DP or company-wide operations. Company paid relocation. $30,000

NEVER A FEE
TO GUM APPLICANTS
Call SHARTY ANAYO

Confidential Professional

ROBERT HALF
DP [illegible]
522 Fifth Avenue
New York, NY 10036
(212) 221-6500

APPLICATIONS PROGRAMMER

Career opportunity for individual who desires to participate in the design, programming and implementation of new and existing retail business systems on an NCR CRITERION 8585 under on-line programming.

COBOL experience essential. Experience with POS systems, on-line credit systems, TOTAL Data Base systems, NCR CENTURY 84 or NCR CRITERION VRX preferred.

Located in the sunny Southwest. Good salary and benefit package. Send confidential resume and salary history to:

Director of Personnel,
Popular Department Stores,
P.O. Box 1899,
El Paso, Texas 79999.

position announcements | position announcements | position announcements | position announcements | position announcements

PROGRAMMERS ANALYSTS . SYSTEMS ANALYSTS

[illegible]

When making a career decision, you should have a choice of options.

Our clients — who are large and small leaders in manufacturing, high technology, leading computer/peripheral co's, insurance, banking and consulting — seek individuals with programming, analytical and/or interpersonal ability.

We individualize our search to meet your career objectives and geographical preferences.

Investigate professional opportunities offering a variety of challenges and environments.

Phone collect or forward your resume to ERWIN KLAGES.

[illegible]

cp computer professionals

Data Processing Placement—Executive Search

15 Lewis Street, Suite 100, Hartford, CT 06103

Computer Programmer

Ferris State College has an immediate opening in the Administrative Computing Systems area. This position requires one year of experience and expertise in COBOL, ASSEMBLER and Data Base. Graduation from an accredited Data Processing Program may be substituted for experience. Our equipment is a 1½ meg IBM 370/145 running under VM. We are supporting DOS/VS and OS/VS1 with on-line application development. Send resume and references to:

Gordon G. Lewis
Director of Computer Center
Ferris State College
Big Rapids, MI 49307

An Affirmative Action/Equal Employment Opportunity Employer

SUNNY SOUTH!

Computer Marketing Opportunities

Marketing Managers/ Specialists - CAD/CAM

Requires a technical degree. Preferred background in sales or analyst experience in industrial markets; working knowledge of FORTRAN and excellent communications skills desirable. Responsibilities will be penetration in computer-aided design markets, including market research, evaluation/recommendation of software products to penetrate markets, merchandising CAD/CAM products through promotion, advertising and seminars, and customer/project tracking.

Processor Product Managers

Product management experience in the areas of computers, peripherals, or associated equipment is required. Technical sales and hardware design or maintenance experience is desirable. Responsibilities will include long-term processor product strategies, proposals and plans for development of specific products and marketing plans and merchandising of current and future hardware products.

Commercial Market Managers

Minimum 7 years experience in commercial data processing in sales, support, and marketing roles. Knowledge of on-line business data processing applications is essential. Responsibilities will be to define opportunity markets for transaction processing applications, to define market requirements for Perkin-Elmer products and services; to promote sales efforts in commercial data processing through customer support, seminars, trade shows, etc.

Product Specialists

Need software and systems persons knowledgeable in multi-discipline operating systems, transaction processing, and event driven real-time applications. Require hardware persons skilled in advanced computer architectures, multi-processors, and intelligent I/O subsystems. Responsible for translating new user needs into a meaningful set of specifications for our engineering department.

Competitive Analysts

Must have good technical, market, analytical, and written communications skills. Candidates will produce regular reports on all major competitors and participate in product and market planning.

Perkin-Elmer's Computer Operations is an organization designed to meet the challenges of the 1980's. Our mandate remains clear: we will continue to provide pioneering technological leadership in the small and medium scale computer industry. Our strength is our people. We have always relied on our staff of dedicated professionals to design, develop, market, sell and service our lines of state-of-the-art minicomputers and systems. At Perkin-Elmer, we believe that technological innovation is the most effective vehicle for providing career growth.

The Computer Marketing organization is responsible for determining the marketing direction for computer operations by identifying markets, predicting new product needs, merchandising the resulting product offerings, training the sales organization, and monitoring the business results. Through a thorough understanding of the markets of today, the technology and the business goals of Perkin-Elmer, computer operations marketeers must consolidate the company's strengths and focus them on opportunity markets of the future. We need people who have experience with the technology and the markets for super minicomputers in the 1980's to join our team.

Perkin-Elmer offers excellent salaries and benefits including company paid dental and medical plans and profit sharing. We are located in a beautiful residential community in Monmouth County, only 1 hour from New York City, with the Atlantic Ocean in our backyard. Please forward your resume including salary history to Mr. Bill Beattie, Perkin-Elmer, Computer Operations, 2 Crescent Place, Oceanport, New Jersey 07757

PERKIN-ELMER

An Equal Opportunity Employer M/F

- **Analyst/Programmers — Cobol**
- **Analyst/Programmers — Assembler Language**

HOME SAVINGS

- **Senior Systems Programmer — VM/CMS Internals**
- **Senior Systems Programmer — DOS/VS Internals**

Challenging openings for Analysts and Programmers with the following minimum qualifications:

- 1 year COBOL or Assembler Language
- Some Applications Systems Design

Preferred Experience

- Financial Background
- Medium to large scale computer systems
- IBM DOS JCL
- Interactive programming

Exciting openings for two Senior Systems Programmers with the following minimum qualifications:

- 1 year VM/CMS operating system internals—or
- 1 year DOS/VS operating system internals
- Strong Assembler Language abilities
- Strong personal desire to enhance operating systems in order to provide maximum system and personnel productivity
- Some experience in user assistance

Home Savings and Loan Association, the nations No. 1 Savings and Loan, has been consistently in the forefront of the development of computer supported financial applications and operating systems. Our data center is committed to the highest level of productivity to support these endeavors. We offer outstanding opportunity for career advancement working in an extremely stable atmosphere of diversified application systems and operating systems. Join us now and experience the excitement of a growth situation and the advantages of working with a highly motivated and competent professional staff.

We offer competitive salaries and a comprehensive benefit program. But most importantly, you will have the opportunity to design, code and test your programs and operating system enhancements in your own office on your own Virtual Machine using our highly developed VM/CMS Interactive Testing System.

For Immediate Action

Call . . . Michael Stevenson, Data Processing Coordinator

(213) 764-0025 Ext. 371

Equal Opportunity Employer M/F

PROGRAMMER/ANALYST

A new position to develop and maintain a management information system for a large Agricultural Research organization.

2-4 years of COBOL programming, preferably with IMS application experience.

Current environment is Amdahl 470 V/6, HASP OS/VS. Job located in medium size community with good employee benefits.

If interested, forward resume with salary requirements to

TEXAS AGRICULTURAL EXPERIMENT STATION
THE TEXAS A&M UNIVERSITY SYSTEM
c/o Personnel Office
College Station, Tex. 77843

An Equal Opportunity Employer M/F

ROBERT HALF

LOUISVILLE

Data Base and Sys Prog. Managers

A large Western Ky. Corp. is looking for 2 Mgrs. with 4 yrs. experience in UNIVAC V6/R2. The data base Mgr. will supervise 3 data base analysts and have responsibility for the design implementation and maintenance of the new Cobtyl data base. The systems programming manager will be responsible for the applications programming and operations staff. A degree is required in comp. or C.S. Interview and re-locations are paid. Liberal benefits and a starting salary to $35,000

TOM WILLIAMS
ROBERT HALF
OF LOUISVILLE, INC.
600 SOUTH FOURTH ST.
LOUISVILLE, KY 40202
(502) 589-1791

position announcements | position announcements | position announcements | position announcements | position announcements

DATA PROCESSING

Opportunities

Our dynamic, growth oriented Company is seeking responsible, intelligent individuals for several openings. Our facility operates under DOS/VS/POWER with On-Line programming, and other state-of-the-art software, on an IBM 370/138. The successful candidates will be hands-on people who enjoy solving business problems.

• PROJECT LEADER

Both technical, (COBOL, JCL, DOS/VS, On-Line Systems), and leadership experience with self-starting drive to plan and execute both development and maintenance efforts of a team of Programmer/Analysts. Development is mixed batch and On-Line using an On-Line programming package.

• PROGRAMMER/ANALYSTS

Minimum 2 years solid experience, COBOL required, with aptitude and desire to develop and maintain sophisticated computer systems.

• MANUAL SYSTEMS ANALYST

Requires experience with good understanding of workflow, flow charting, procedure writing, controls, and writing systems specifications.

We are $60 million, publicly-held manufacturing and marketing corporation located in an attractive suburb of Pittsburgh. Our location affords the opportunity to live in a rural, suburban, or urban community with easy access to cultural centers. Our working conditions are superior, with free parking, on premises food service, flextime hours, and relaxed dress guidelines.

Our salaries are very competitive and merit adjustments are annual, based on performance. We offer a fully-paid medical benefits package, including dental, and educational reimbursement program, 12 paid holidays, liberal vacation allowance and a wide range of other standard benefits. SEND RESUMES IN CONFIDENCE, TO: Catherine Brenholts.

ACTION INDUSTRIES, INC.
CHESWICK, PA. 15024

AN EQUAL OPPORTUNITY EMPLOYER M/F

ENGINEERS

SWITCH ON to a future of unlimited potential in DATA COMMUNICATIONS

Packet switching IS the future in data communications, and GTE Telenet is the recognized national leader in packet switching. We pioneered it. We proved it. And now we are dynamically expanding our packet switching network to meet fast-growing nationwide demands for GTE Telenet service.

You can share the enormous opportunity provided by an engineering career at GTE Telenet. We seek engineers with data communications backgrounds at junior to senior levels with BS, MS and PhD degrees (or equivalent experience). Positions are available at our metropolitan Washington, D.C. headquarters facilities. We seek:

- Systems Engineers
- Network Engineers
- Design Engineers
- Product Engineers
- Switching Engineers
- Facility Engineers
- Electronic Engineers (Software Backgrounds)
- Field Service Engineers
- Project Engineers

Positions are also open to Data Communications Marketing Professionals, Technicians, Programmers, and Analysts.

You will enjoy the GTE Telenet environment—innovative, stimulating, challenging. And you will enjoy the growth potential and advancement opportunities inherent in our national leadership. A generous compensation/benefit package is still another reason to join us now. Send your resume in complete confidence, including salary requirements, to: Douglas B. Macaulay, Manager of Employment, GTE Telenet, 8330 Old Courthouse Road, Vienna, VA 22180. An equal opportunity employer m/f/h.

GTE Telenet
The data network
A part of GTE

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Turnkey Systems and Real Estate.)

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are $73.50 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $147.00 per insertion. Extra space is available in half-inch increments and costs $36.75. Box numbers are $10.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us), WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired: _____ columns wide by _____ inches deep.

Issue Date(s): _____

Section: _____

Signature: _____

Name: _____

Company: _____ Title: _____

Address: _____

_____

Telephone: _____

Send this form to:
CLASSIFIED ADVERTISING, COMPUTERWORLD
375 Cochituate Road, Route 30, Framingham, MA 01701

DIRECTOR FOR COMPUTER SERVICES

Harford Community College has an immediate need for an individual to be responsible for directing administrative and instructional computer services for the entire College. The person selected must have experience in hardware and software selection, and be familiar with a CICS on-line environment using COBOL and BAL. In addition to possessing excellent technical skills, a Master's Degree in an appropriate field, four years of experience in progressively responsible positions, the successful candidate must be able to communicate effectively with individuals from all areas of the College.

Beginning salary range is $27,651 to $29,912 depending on experience; excellent fringe benefits.

Application deadline is February 28, 1981. Send letter of application and resume including salary history to

Edward C. Kuhl, Jr.
Director of Personnel
Harford Community College
401 Thomas Run Road
Bel Air, MD 21014

HCC is an affirmative action equal opportunity employer

PROGRAMMERS AND ANALYSTS

Free Employment Service

Northeast, Southeast & Midwest U.S.

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support.

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

RSVP SERVICES, Dept. C.
Suite 706, Oak Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dakota Hall
1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES
Employment Agency for Computer Professionals

PROGRAMMER

Manufacturing Systems

We're a major operational division of a top Fortune 500 company with an immediate growth opportunity for a Programmer to join us at our modern production facility in north central Iowa.

The person chosen to fill this position will be working with a IBM 4331 computer using the following computer resources:

DOS/VSE	COBOL
ICCF with online programming	VSE/VSAM
CICS/VS with command language	DL/I
Assembler	DISS/CICS/VS

Responsibilities will range from debugging, program implementation and documentation of manufacturing oriented systems.

In addition to a pleasant country atmosphere you'll be rewarded with a competitive salary, comprehensive benefits, paid relocation and opportunities for growth. Send resume, in confidence, including salary history to:

Sylvia K. Gulick
Deluxe Products Division
WALKER MANUFACTURING COMPANY
311 N. Park Street, Lake Mills, Iowa 50450
or call collect 515-592-1300
An Equal Opportunity Employer M/F

EDP MANAGER

Large southern int'l institution, Banking Dept. Project control exp. Analysis Managerial skills. TO $35K

PROGRAMMER/ANALYST

Large communications firm. 2+ yrs. COBOL in small scale IBM shop. TO $24K

DESIGN ANALYST

Electronic Mfg. Firm. 1+ yrs. exp./micro routine exp. FORTRAN/AE. DESIGNER bkgd. on PDP 11. BS/1-1[illegible] Helpful. TO $20K

MANAGEMENT SEARCH OF LOUISIANA, INC.

135 St. Charles Ave.
New Orleans, LA 70130
(504) 524-2772

position announcements | position announcements | position announcements | position announcements | position announcements

SYSTEMS ANALYST

Are you interested in a systems challenge?
Does a visible master plan appeal to you?
Do you enjoy a structured environment?
Do you prefer user and management team input in the development cycle?
WE CAN OFFER YOU ALL OF THE ABOVE, PLUS MORE!

Our bank holding company wants new sophisticated on-line banking systems. All major applications are being upgraded.

Applicant should have 4-6 years design and programming experience, preferably on IBM systems. CICS experience a plus, but not mandatory.

If any of the items mentioned are what you are looking for and you would like to live in a pleasant midwestern city, please submit your resume to:

GENE KETCHMARK/VP
BRENCO AUTOMATION CENTER, INC.
717 Mulberry, Suite 500
Des Moines, IA. 50309

Subsidiary of Brenton Banks, Inc.

Arizona State University
Programmer/Analysts
Standards, Quality Assurance Specialist
Scientific Programmer

A position is open for a Programmer/Analyst to work in the area of Production Standards Enforcement. This position is responsible for the quality assurance of systems developed by the Applications Staff so they are turned over to the Operations Staff for regular production.

The system environment is IBM, MVS, WYLBUR, COBOL and the IDMS data base system. Applicants should have at least two years experience in a similar environment. Persons classification will be Programmer/Analyst II with a minimum starting salary of $16,587. Position closes 29/February/80.

Position exists for a Scientific Programmer I, also. Activity is developing complex programs and generally works with defined problems requiring a theoretical knowledge of analytical approaches to problem solving in the area of chemical process simulation and optimization. Must have working knowledge of FORTRAN, COBOL, and other programming languages. Knowledge of FLOWTAN, CHESS and other chemical process simulation packages desirable. Annual Salary $16,387. Bachelor's degree required and Master's preferred in Chemical Engineering. Previous programming experience required.

Application period ends 5/March/80.

Submit applications to Arizona State University, Personnel Department, ASU Box, Tempe, Arizona 85281. Equal opportunity/affirmative action employer.

PROGRAMMER ANALYST

Opening in advanced Sys/3 Mod 15D installation. 18 months experience with CCP required. Manufacturing background and good communication skills helpful, excellent benefits, in a growth oriented company. Please send resume to personnel manager.

Goldblatt Tool Co.
511 Osage
Kansas City KS 66118
(913) 621-3010

An equal opportunity employer

SPERRY UNIVAC

ACHIEVE THE HEIGHTS OF SUCCESS WITH SPERRY UNIVAC...

WORLDWIDE AIRLINE OPERATIONS

We Offer Challenging, Dynamic, Career-Oriented Positions In The Following Geographic Locations:

SAN FRANCISCO, CA., MIAMI, FL., BLUE-BELL, PA., WINSTON-SALEM, NC., MINNEAPOLIS, MINN., & LOS ANGELES, CA.

If You Have 3-5 Years Experience with Two or More of The Following areas of Technical Expertise:

COBOL, FORTRAN IV, OS 1100 EXEC 8, DMS INTERNALS, CMS INTERNALS, 1100 SYSTEMS SUPPORT, AIRLINE DATA PROCESSING EXPERIENCE.

Then Immediately Send Your Resume To:

G.D. Le Andre
8675 N.W. 53 St. #117
Miami, Florida 33166

We offer a comprehensive benefits package and lucrative starting salaries. Be sure to specify any geographic preference on your resume.

SPERRY UNIVAC

PROGRAMMERS/ ANALYSTS

$30,000+ Potential
IBM or BURROUGHS

The nation's leading software services company has systems and on-line positions available for several select "Pros" who can work smart and hard! Compensation and fringes are the best in the business-bar none!

Banking software conversion installation jobs involve extensive national and international travel from Central Florida headquarters. On-line systems positions require much less travel.

COBOL experience (banking applications preferred) and appropriate college education required.

Send resume NOW with current salary in strict confidence if you want to work in an exciting state-of-the-art company who expects a lot and rewards accordingly!

CW Box 2218
375 Cochituate Rd., Route 30
Framingham, MA. 01701

An Equal Opportunity Employer M/F

ANALYSTS PROGRAMMERS

Would you enjoy supportive management, challenging assignments, reward based on performance not politics, pay for all hours worked, bonus opportunities & more?

We need dedicated professionals with at least 3 years DP experience with IMS, CICS, PL/1, TSO, OS/COBOL. Age no consideration, willingness to travel a plus. Call collect Judy Hickman or Becky Finley (404) 633-6367 or send resume to:

DATA RESOURCE CORP.
1649 Tullie Circle N.E.
Suite 110
Atlanta, Ga. 30329

Equal Opportunity Employer

DATA SYSTEMS CONSULTANT

Tampa, Florida

This is an opportunity to enhance your data processing talents with a national accounting firm in Tampa. Our rapidly expanding regional consulting group provides management consulting services to clients in Jacksonville, Orlando and Tampa.

The successful candidate will be career oriented with excellent technical and communication skills. Technical requirements include hardware and/or system software responsibilities for a large facility or vendor providing data processing services. Requirements include industry experience in either health care or banking. Undergraduate degree in computer science, accounting or related field and a minimum of 3 to 5 years experience required. Graduate degree preferred. Position requires 2-3 days travel per week, mostly in Florida.

To confidentially explore this opportunity, please send your resume including salary history, to:

Donald E. Hensley • (813) 223-6871
910 Flagship Bank Bldg. • Tampa, FL 33602

Equal Opportunity Employer m/f

position announcements | position announcements | position announcements | position announcements | position announcements

TDC

Senior Systems Engineer

San Francisco Peninsula

Technology Development Corporation is a small but highly sophisticated engineering and computer services firm specializing in total system services to both government and industry.

We currently have a position available for a Senior Systems Engineer who will be responsible for the development of large scale graphic editing systems. PhD or MS in Computer Science or equivalent experience required in the areas of

- Graphics Hardware
- Computer Peripherals
- Large Database Design
- System Software

TDC's compensation and benefits program reflects our progressive attitude towards providing our employees with the kind of professional environment we feel is necessary to attract and retain the finest people in our business. For immediate consideration, please submit a resume detailing employment history and salary requirements to: J. O'Reilly, Technology Development Corporation, Advanced Computational Lab, 1095 E. Duane, Sunnyvale, CA 94086, or call (408) 735-8536.

We aggressively support equal opportunity and affirmative action.

Do Florida Salaries Match Northern Ones? TRY THESE!

MVS, CICS, Other Systems Programmers	to $35,000
UNIVAC Software, DB, TP	to $35,000
IMS, Other DB Specialists	to $35,000
Real-Time, Scientific Programmers	to $32,000
Voice, Data Communications	to $32,000
IBM Operations Management	to $30,000
Commercial Programmers & Analysts	to $30,000

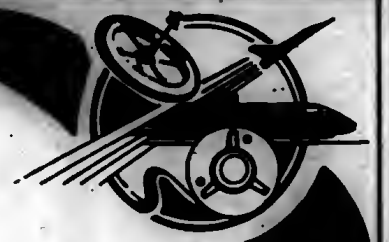
To explore these and other DP opportunities in Florida and throughout the Sunbelt, send your resume to, or call collect:

David Strasberg/305-434-6112
Data Sciences Personnel, Inc.
P.O. Box 8577, Hollywood, Florida 33024

DATA SCIENCES PERSONNEL, INC.

A MEMBER OF NATIONAL COMPUTER ASSOCIATES

Programmer Analysts



AiResearch Provides You With More Than Just A Career!

A unique blend of technology and resources has made AiResearch one of the leaders in rapid transit. Our gas turbine engines are helping to solve a variety of transportation problems, both present and future. And we keep our employees on the move, too. Through expansion and diversification, opportunities for career advancement are constantly being created. Why not come to Phoenix and see how you can grow along with us?

APPLICATION PROGRAMMER/ANALYSTS

Experienced in any of the following areas:

- Manufacturing Planning and Control Systems
- Sales Forecasting
- Financial Control Systems
- Cost Schedule Control System (C/SCS)
- Human Resource Management Systems

Plan and perform analysis of major company activities and guide the subsequent design and implementation of systems in a large highly technical manufacturing and engineering company. Knowledge of transaction processing, data base design, and manufacturing, engineering and financial systems is desirable.

Current equipment is 370/158AP; Software is MVS, TOTAL data base management system, ENVIRON/1 teleprocessing monitor.

PRODUCTION CONTROL — PROGRAMMER ANALYST

Prior experience with IBM hardware and software. COBOL and JCL in an MVS/JES2 environment required. Experience with ROSCOE, LIBRARIAN, and EASYTRIEVE or previous production control experience is desirable.

Responsibilities include analysis, design, programming and implementation of data processing production control systems.

A full range of company benefits, a salary commensurate with your experience, and relocation expenses are only a part of the package we can offer you. Send your resume and salary history today to: Dave Drugman, AiResearch Manufacturing Company, P.O. Box 5217, Phoenix, Arizona 85010.

GARRETT

AIRESEARCH MANUFACTURING CO.

an equal opportunity employer m/f

TEST ENGINEERING MANAGER

MANUFACTURING . . . Ahead of the Times. At Computervision, we do more than design interactive graphics systems. We manufacture them, to great profusion, to boot, we are the world's largest manufacturer of interactive graphics systems for industrial automation. We need more manufacturing professionals putting our ideas into action. Turning our visions into concrete reality. It's one of the most important jobs that has to be done. And it can be one of the most challenging, rewarding, and exciting jobs to pursue.

We have an opportunity for a strong performer with managerial skills to assume broad-based responsibilities in the following areas: digital and analog circuitry testing, program development for automated test and the development of corporate product test strategies, assume responsibility for all test development and package group of 16-20 professionals involved in development of test procedures. Requires BSEE or MSEE and 6-10 years experience in production. Familiarity with current automated test equipment and techniques, such as Stanford and Computer Automation, is essential.

Computervision Corporation offers an excellent benefits package that includes company paid medical, dental, life and disability insurance, retirement program, tuition reimbursement/advancement, and an incentive profit sharing plan.

Please submit resume to Merle Kilgore, Employment Supervisor, Dept. R6, Human Resource Department, Computervision Corporation, Crosby Drive, Bedford, Massachusetts 01730.

COMPUTERVISION
The Professionals' Choice

An Equal Opportunity Employer M/F/H

PROGRAMMER ANALYSTS

Salary To $2542/Mo.

The Bay Area Rapid Transit District has several openings for Programmer/Analysts to perform programming and analytical duties in assigned areas, such as, but not limited to: accounting, payroll and inventory control.

MINIMUM QUALIFICATIONS

EDUCATION: Degree in Computer Science, Business Administration or equivalent combination of education and business experience.

PRIOR WORK EXPERIENCE: 1-3 years programmer/analyst experience in a variety of data processing applications using current generation computers. Technical competence in COBOL, Assembler language and thorough understanding of at least one Operating System and related software for a current generation computer required.

Please send resume - NO PHONE CALLS PLEASE — to:

BART EMPLOYMENT OFFICE
800 Madison Street
Oakland, CA 94607

BART is an equal opportunity/affirmative action employer. Women and minorities are strongly encouraged to apply.

BART

position announcements | position announcements | position announcements | position announcements | position announcements

Master of Science
Computer and Information Science

A professional course of study in the design and management of complex information systems focusing on

- Broad fundamentals of computer and information science
- Design methodologies for reliable, maintainable, and usable information systems
- Management skills crucial to the planning, installation, and effective use of information systems
- Social, ethical, and organizational issues related to information systems

Dartmouth is renowned for development of the computer language BASIC and one of the first successful time-shared systems. The Master's Program is designed to equip tomorrow's DP managers to develop other innovative, easy-to-use systems.

Write to: Program in Computer and Information Science
Dartmouth College
Hanover, NH 03755

Dartmouth College

MANAGEMENT INFORMATION SPECIALIST
$33,063

This individual will serve as the data processing advisor to the Chancellor by reviewing, for their appropriateness and impact on DP master plans, proposals for hardware, software, and services which may originate from the Dept. of Data Processing, administrative DP users, or vendors; serving as a resource person for data processing advisory committees and as an independent evaluator for our data processing services.

ENVIRONMENT: Our data processing system is a data base distributive teleprocessing network consisting of approximately 200 terminals and 15 remote job entry devices. Our main computer, an IBM 370/168, provides business, administrative and instructional programs. We are upgrading to a triple processor fully integrated system with 4 network processors. Our main shop language is ANS COBOL V4 for applications programming APL and BASIC are used for our instructional programs.

LOS ANGELES COMMUNITY COLLEGES
617 West Seventh
Los Angeles, Ca. 90017
Phone: Mounce (213)625-7700 x341

WHY NOT MOVE TO FLORIDA!

Pratt & Whitney Aircraft, a Division of United Technologies Corporation, has a number of openings in West Palm Beach, Florida. We offer a professional environment with state-of-the-art equipment. An appropriate degree and experience is required.

APPLICATIONS SYSTEMS ANALYST/PROGRAMMERS

- Manufacturing Applications
- Financial Systems
- Product Support Systems

Desirable background will include: two to ten years experience, extensive COBOL programming, OS/VS JCL on large IBM Computers, on line systems experience, Systems Analysis and Design, and well developed writing and communications skills.

TECHNICAL SUPPORT ANALYST

Candidate should have one to five years experience in MVS, telecommunications, VASM, TCAM, 3705/NCP, VM/CMS, Graphics, and Plotting Support.

EQUIPMENT EVALUATION ANALYST

Candidate should have one to five years experience and some background in computer performance measurement and capacity planning.

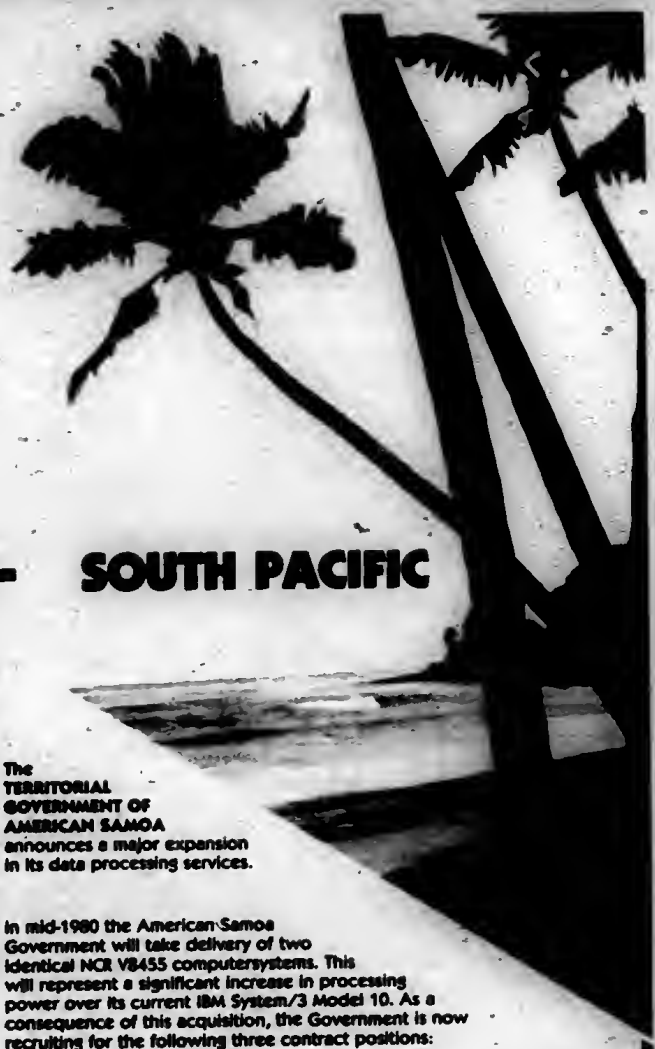
DATA BASE ADMINISTRATION ANALYST

Desirable background will include: IMS/VS DB/DC in large scale MVS environment, Application Design, Logical Relationships and Data Base Design, maintaining Data Dictionary systems, and developing IMS DB/DC Education Programs.

Send your resume including salary requirements to:

PROFESSIONAL PLACEMENT DEPARTMENT BH 111
Government Products Division
P.O. Box 2691 Mail Stop R-77
West Palm Beach, FL 33402
An Equal Opportunity Employer M/F

PRATT & WHITNEY AIRCRAFT GROUP UNITED TECHNOLOGIES



SOUTH PACIFIC

The
TERRITORIAL GOVERNMENT OF AMERICAN SAMOA
announces a major expansion in its data processing services.

In mid-1980 the American Samoa Government will take delivery of two identical NCR V8455 computersystems. This will represent a significant increase in processing power over its current IBM System/3 Model 10. As a consequence of this acquisition, the Government is now recruiting for the following three contract positions:

COMPUTER PROGRAMMER (1)

Requires a Bachelor's degree or equivalent with two years of study in electronic data processing plus four years' experience as a Computer Programmer. Years of directly responsible employment may be substituted for a portion of the academic requirement.

COMPUTER PROGRAMMER/ANALYSTS (2)

Requires a Bachelor's degree or equivalent to computer science, business administration, mathematics, engineering or closely allied field plus six years' experience, at least three of which was as a Project Leader.

In addition to these minimum qualifications, the successful applicants should have a thorough knowledge of NCR's VIX Operating System, COBOL '74, NCR TRANPRO as well as extensive programming experience with typical financial applications. Knowledge of IBM's RPG II is highly desirable as is experience in converting from batch processing to on-line computer systems.

The American Samoa Government pays competitive salaries as well as providing free transportation and shipping allowances to contract employees and their dependents. These positions are non-Federal employment for a two-year term and include benefits such as sick leave, twenty-six days annual leave, free medical care and furnished housing for a nominal monthly rent. American Samoa is a Territory of the United States and is located to the heart of Polynesia; it enjoys a year-round tropical climate and an informal lifestyle similar to Hawaii.

To apply for either of these positions, please airmail a complete resume and copies of your credentials to: The Director, Office of Manpower Resources, AMERICAN SAMOA GOVERNMENT, Pago Pago, American Samoa 96799.

DEADLINE FOR RECEIVING APPLICATIONS IS FEBRUARY 29, 1980. Selective interviews will be conducted in the United States during March and/or April with a probable commencement date of no later than June, 1980.

Permanent residents of American Samoa and those entitled to permanent residency who are not now living in American Samoa will be given full contract benefits, if selected. All applicants will receive consideration without regard to race, color, religion, sex or national origin. AN EQUAL OPPORTUNITY EMPLOYER.

position announcements | position announcements | position announcements | position announcements | position announcements

DATA PROCESSING PROFESSIONALS

ARE THE FOLLOWING FACTORS IMPORTANT TO YOU IN SELECTING A JOB?

- Excellent quality of work life
- Located in a year-round vacationland
- Suburban environment PLUS big-city conveniences
- "Ground Floor" opportunity to join an exciting team in a successful, growing company using a 4341 with MUS, TSO.
- Excellent salary, generous benefits package, liberal relocation policy.

IF SO, WE HAVE A JOB YOU'RE SURE TO LIKE, INCLUDING:

- Senior Systems Analyst-Project Leader
- Systems Analyst: Application in Finance, Manufacturing, Marketing and Human Resources
- Programmer and Programmer-Analyst: experience with NCR or IBM acceptable

We are HAWORTH Mfg. Inc., and we would like to tell you more about ourselves. To pursue this opportunity, send a current resume' to:

MANAGER OF EMPLOYEE RELATIONS

HAWORTH®

OFFICE INTERIOR SYSTEMS
645 East 32nd Street Holland, MI 49423

An Equal Opportunity Employer

Your Ultimate Choice

WE CAN DO FOR YOU WHAT YOU CAN'T DO FOR YOURSELF

Many of the premier data processing jobs in the United States are with the major oil companies located in the Houston area. Unfortunately, these companies receive so many applications for employment that your chances of obtaining an interview on your own are minimal at best.

M. David Lowe's data processing division has spent a great deal of time and effort developing contacts within these companies that can maximize your chances of working in the world's most profitable and secure industry. Our reputation is one of reliable service to our clients, including a screening procedure that is often more rigorous than their own. In many instances, we will arrange your interview, saving both you and the company a great deal of time.

If you are interested in working with the best and prefer to approach companies in a professional, confidential and highly efficient manner call, Roger Hall or Mari Webster at (713) 631-6666. Leave your name and number and we will call you at our expense.

These are a few of the positions we currently have open in the energy industry:

DATA BASE ANALYSTS (Houston) Develop and control IMS DB/DC. Interface with other software products such as ADF, LIBRARIAN, and IMS productivity aids in an IBM 3032 shop ..... Salary area $30,000

DATA BASE ANALYSTS (Overseas) Same duties as above, plus interface with operating systems software group ..... Salary area $42,000

MVS PROGRAMMERS (Houston) Maintenance of MVS using SMF. Will have opportunity for learning ACF/VTAM and IMS systems programming. ..... Salary range to $28,000

MVS SYSTEMS PROGRAMMER (Overseas) Same as above plus hardware and software evaluation duties. ..... Salary area $40,000

IMS APPLICATIONS PROGRAMMERS (Houston) Wide variety of projects for degreed COBOL or PL/1 programmers with IMS experience. Duties range from straight coding to project management responsibilities. ..... Salary range $22,000-$30,000

IMS APPLICATIONS (Overseas) Full range of projects, including scientific, oil and gas accounting and financial applications. All levels of positions open. ..... Salary range $36,000-$50,000

TECHNICAL SUPPORT ANALYST (Houston) Provide technical support in problem solving for programmers and analysts regarding JCL, compilers and use of the MVS operating system. ..... Salary area $28,000

SENIOR OPERATING SYSTEMS SPECIALIST (Houston) Supervise six analysts that will provide technical expertise and work direction to support the operating and teleprocessing systems and subsystems. Install, test, modify, and maintain all hardware and software products ..... Salary area $32,000

ALL FEES ASSUMED BY CLIENT COMPANIES
NEVER A CONTRACT TO SIGN

M. david lowe
PERSONNEL SERVICES

403 Houston Natural Gas Building
1200 Travis

Houston, Tx 77002
(713) 659-6666

ATTENTION

IBM SYSTEM 3

SUNBELT LOCATIONS

CALL NOW!!
800 633-6644 TOLL FREE
IN ALA. 205-942-8457 COLLECT

OLE OLSON
OR
RICK WHITE

SEND RESUME TO:

GENERAL PERSONNEL CORP
413 GADSDEN HIGHWAY
BIRMINGHAM, ALABAMA 35235

E.D.P. MANAGER

Position immediately available, to manage four (4) person department using IBM SYS/3, Mod 150, W/CCP. Minimum two (2) years experience in RPG II programming and OCL. Working knowledge of CCP and SYSGEN required. Must be able to operate and program as well as manage. Excellent paid fringes, salary open.

Send resume to

ENSIGN ELECTRIC DIV.
Harvey Hubbell Inc.
P.O. Box 7758
Huntington, WV 25775

An equal opportunity employer

SYSTEMS PROGRAMMER/ PROGRAMMER ANALYST

Ferris State College has an immediate opening for this position. The responsibilities will include both software support, to supplement current support, and applications development. This opening is to our Administrative Computing Department and requires extensive knowledge in systems generations, COBOL, ASSEMBLER and Data Base. Our equipment is a 1½ meg IBM 370/145 running under VM. We are supporting DOS/VS and OS/VS1 with on-line applications. Send resume and references to:

Gordon G. Lewis
Director of Computer Center
Ferris State College
Big Rapids, MI 49307

An Affirmative Action/Equal Employment Opportunity Employer

ROBERT HALF

FLORIDA

NO STATE INCOME TAX
LOW COST OF LIVING
NO SNOW!

PROG/ANAL

370/OS/MVS	17K
370/DOS/VS Asstg	18K
370/Burr Banking	20K
370/Burr B&L	19K
NCR Neat/3 Cobol	19K
370/DOS/VS Mfg	20K
Sys/3 CCP	16K
Any Hdwe-Hvy Asstg	22K

SYS PROG

DOS/VS CICS	22K
OS/MVS	22K
OS/VM	22K

OTHER

Perf Analyst	20K
Tech Writer	20K
DBA DB/DC	20K
DBA	20K
TSO Specialist	20K
EDP Auditor	20K
Telecom Spec	20K
Scientific	20K

Many others to choose from. All fees and relocation paid. Mail resume to or call collect.

STAN ALLEN

ROBERT HALF OF TAMPA, INC.
1311 N. Westshore Blvd.
Tampa, FL 33607
(813) 879-4181

APPLICATIONS PROGRAMMERS NEW TELEPROCESSING NETWORK INCLUDING:

-Dual IBM 3031 -CICS/DS-VS1
-10 IBM 8100's in a distributed network

Prefer degreed candidates with 1 or more years COBOL experience. Application experience on IBM equipment a plus. These positions offer

- Excellent advancement potential
- Timesharing facilities for program development
- Competitive salary
- Flexible working hours
- 2 weeks vacation in 1980
- Payroll deduction stock purchase plan
- Profit sharing
- Excellent fringe benefits
- Convenient downtown Chicago location

Submit resume including salary history, in confidence to or if you prefer, call:

Director of Employment
Chicago & North Western Transportation Company
400 W. Madison Street
Chicago, Illinois 60606
Tel. (312)648-5488

An Equal Opportunity Employer M/F

TELEPROCESSING CONSULTANT

We are seeking an individual to expand our use of paperless processing with hospitals and Doctors through the concept of utilizing our teleprocessing network. Must have at least 5 years data processing experience to include a thorough knowledge of teleprocessing. Some in-state travel will be required.

Our salary, benefits and career opportunities are excellent! If interested, please send resume to:

EDP SPECIALIST
Personnel Department
BLUE CROSS OF VIRGINIA
P.O. Box 27401 Richmond, VA 23279

An equal opportunity employer m/f/h

"Informatics made a lot of promises when they hired me. All of them were kept."

Informatics Professional Services Operation provides consultant services to major corporations around the U.S. We've built our reputation on our staff's ability to successfully complete difficult DP projects for our clients. We're looking for good people to join Tim Malamphy as programmer/analysts.

In this position, you'll be helping to develop and implement effective solutions to our customers' business and professional needs, and you'll be participating first hand in new developments in database and on-line techniques.

The people we're seeking have creative minds that can come up with a workable solution to an immediate problem and possess the energy to implement that solution. A background of at least two years' experience on large IBM systems using COBOL is necessary (experience with IMS, MARK IVs or CICS is also a plus).

Informatics offers incredible variety, the opportunity to work with virtually every type of data processing system, a real chance to make as great a contribution as you want — as well as an unlimited growth factor. And, given our Fortune 500 clientele, there's the level of compensation you might expect — plus paid overtime.

The good life in data processing is waiting for you right now. Just send your resumé to:

Professional Services
Informatics Inc
1 Market Plaza
Spear Street Tower
San Francisco, CA 94105
Or call us at 415/964-9900 and ask for Sonia.

An equal opportunity employer m/f/h

informatics inc

We can help each other grow.

See our ad on Page 46.

Offices in San Francisco, Los Angeles, Palo Alto, Seattle, Dallas, Houston.

position announcements | position announcements | position announcements | position announcements | position announcements

SOFTWARE
Pacific Northwest

Puget Sound industry leader is rapidly expanding and implementing new technology into the corporate and regional facilities. A variety of positions are available from SYSTEMS - PROGRAMMERS to TECHNICAL CONSULTANTS in the following areas: IBM VM/CMS, DOS/VS; OS/VS/MVS, CICS INTERNALS, DATA COMMUNICATIONS: HONEYWELL GCOS/LEVEL 6, HP 3000 IMAGE/QUERY, DEC PDP-11/70, RSTS/-RSX. Positions range from mid 20's to mid 30's plus generous relocation package and benefits.

Other positions in applications, communications and management are available throughout Oregon and Washington. To explore a career move, call collect:

Al Friedman
(206) 455-5300
310-108th Avenue NE
Bellevue, WA 98004

---

370 DOS/VS/CICS experienced programmer/analyst to assume project responsibility for multi-location, multi-terminal word processing application, with 4300 support. Long-term career and growth opportunity in service organization. Central Florida. Write:

F. Walker
1211 S. Westshore, Suite 105
Tampa, Fla. 33607

SEATTLE

A coveted city with oceans and mountains for a lifetime!

Mgr. Sys/Prog	to $39,700
Proj Leaders, tech, other	to $35,000
Mgr. Tech Support	to $35,000
Systems Prog	to $30,000
Anal/Prog	to $30,000
Anal. measurements	to $27,000

Call collect
206-455-5444

COMPUTER PERSONNEL & CONSULTANTS, INC.
1 Lk Bellevue Dr., Bellevue, Wa. 98005

PROGRAMMER
RPG II or COBOL experience. Will start at 21K.

ANALYST
With experience. Will start at 24K.

Please send your resume with salary history to or contact:

Jeff Jackson
Personnel Manager
GE-TEC DYNAMIC INC.
250 W. Stanley Ave.
Ventura, CA 93001
(805) 643-5171

Equal Opportunity Employer M/F

Data Processing Opportunities

One of the things you can count on Programming at Hammermill: a Great Career!

Because here at Hammermill, opportunity is for real. As a leading Fortune 500 producer of paper and allied products, we recognize that in today's complex world, data processing and management information is vital. That's why we've installed the most advanced equipment....and look for the best available talent....and reward them accordingly. Extraordinary expansion of our EDP capabilities have created several outstanding opportunities in the following areas:

■ SYSTEMS ANALYST / PROGRAMMER
Appleton, Wisc.
Requires a minimum of 2-3 years' experience including working knowledge of COBOL, CICS, and DL/1. College degree desired, but not necessary. For the next year or so, your responsibilities will entail working on a Customer Order Processing system utilizing DOS/VSE, CICS, and DL/1 on an IBM 4300 using 3270 CRT's and printers. SPM or ICCF will be used for the program development.

■ SYSTEMS ANALYST / PROGRAMMER
Appleton
As above, this spot also calls for a minimum of 2-3 years' experience and working knowledge of COBOL, CICS, and DL/1. College degree desired, but not necessary. Your background should also include exposure to a 370/148 DOS/VS environment; a minimum of 1 year's systems design experience would be helpful. This is a temporary assignment in our Data Center which will afford you the opportunity to learn the environment several development projects are pending—expected to commence this coming summer. In the interim, you'll be involved with general maintenance on a variety of installed systems. Our Data Center operates on Batch, on-line, RJE, and distributed (3790) applications support.

■ SYSTEMS ANALYST / PROGRAMMER
Erie, Penna.
This position calls for the same minimum requirements as above, with some systems analysis desired; familiarity with COBOL a must. You'll become involved with the programming of an hourly payroll project using an MSA payroll package; and will also assist in installing the system and training of user personnel. Duties will require interfacing not only with internal personnel but outside contractors as well. CICS on-line transactions involved will call for use of COBOL and MSA report generation package.

■ SYSTEMS ANALYST—Erie
Requires an undergraduate degree, Master's desirable, but not a must; plus 3-5 years' experience. You should be able to offer current experience in DOS operating systems, RPG programming and COBOL. You'll be directing two short conversions of a small data processing shop from IBM System 3 Model 10 Batch to an IBM 4300 DOS Batch.

■ STANDARDS ANALYST—Erie
In addition to a Bachelor's Degree or equivalent, you should have systems experience and an awareness of COBOL, ASSEMBLER, and RPG. A minimum of 6 years' in EDP are required along with general knowledge of large-scale DP functions. Future job possibilities include Standards Coordinator, Lead Systems Analyst, or Project Supervisor in the Systems Department Group.

■ SYSTEMS ANALYST / PROGRAMMER—Erie
Requires 2 years' programming experience using COBOL (EASYTRIEVE background desirable). Good analytical skills with experience in manufacturing systems, IBM 370/303X environment, OS/VS1 and data base / data communications experience desirable. In addition, a desire to work on a variety of applications would be an asset. You'll troubleshoot problems with existing systems and designing, coding and implementing modifications to those systems. Long term projects could lead to original systems development of manufacturing or financial applications.

What you should have gathered by now is that here at Hammermill, there's a whole lot going on for talented EDP pros who don't want to get stuck in a rut. Diversity, systems improvement, and challenge are a way of life here. You'll also enjoy outstanding potential for personal and professional growth, salaries commensurate with experience and responsibilities, plus an excellent benefits package. Both Erie and Appleton offer a choice lifestyle for you and your family with educational and recreational facilities closeby. Please send your confidential resume, indicating specific position in which you're interested to: Rodney G. Butler, Manager, Corporate Recruiting, Hammermill Paper Company, P.O. Box 1440-C, Erie, Pennsylvania 16533. Hammermill is an equal opportunity employer m/f.

Lease Management System Development

Come join Hewlett-Packard's fast-growing Leasing Group for an exciting position in Finance and Systems Analysis.

You will not only manage our Lease Management System, but the entire leasing process. You should have a financial background and 3-5 years COBOL experience in an OS/VS environment. Experience with HP3000, BASIC and KSAM is a definite plus.

Hewlett-Packard provides excellent compensation and benefits including cash profit sharing and a stock purchase plan.

If this challenge interests you, please send your resume to our Operations Manager, David Busch, Building #28A, Hewlett-Packard Company, 1501 Page Mill Road, Palo Alto, CA 94304.
We are an equal opportunity/affirmative action employer.

HEWLETT PACKARD

HOUSTON

State-of-the-art environment! Planned career growth. If these are important to you, you should be in Houston.

MVS Systems Programmer	$18-35K
DOS Systems Programmer	$4-60K
IMS Data Base Analyst	$9-35K
Project Lead - Banking	$8-60K
Sys Analysts - Financial	$8-51K
Sys Analysts - Manufacturing	$8-60K
Sys Analysts - Gen Ledger	$8-60K
Programmer - IMS	$8-60K
Programmer - GL	$8-60K
Programmer - ALS	$8-60K
Programmer - DCS	$8-60K
Programmer - CICS	$8-60K
Programmer - DEC PDP 11	$8-60K

If you are interested in relocating to the SUNNY HOUSTON area, please call JIM FLEMING (collect) or send your resume to:

EDP PLACEMENT SPECIALISTS

PROFESSIONAL DEVELOP
EDP DIVISION
Two Allen Center, #1700
Houston, Texas 77002
713-757-1144

HOUSTON

● Internal Consultant $36-40K

Major firm seeks indiv. with a varied background (different vendors) in hardware & software. Exp. in hardware & software evaluation & selection esh some major area of applications exp (business systems, mfg, etc.) is a requirement. Position offers excellent growth into line management and an opportunity to travel.

● CICS

Systems Programmer $29-35K
Prog Analyst-Command level $25-30K

Major IBM user seeks indiv. with good CICS exp (3-5 yrs) to participate in major new development effort. Experience with IDMS a plus. State of the art installation with excellent benefits.

● IDMS

Database Administrator $30-38K
Database Analyst $42-35K

Major Houston based firm seeks indiv. with 3-5 years exp. with IDMS. Excellent benefits & state of the art IBM installation.

● Prog Analyst-The Woodlands $23-28K

Avoid that long commute and increase your available time 2½ hours per day. This major firm is seeking indiv. living in Northwest Houston to work both in maintenance programming & development. Requires background in COBOL & IBM Systems. Any experience with CICS & IDMS a real plus.

the jarvis walker group
1700 W. Loop So., Suite 370.
Houston, Texas 77027 (713) 961-3600

position announcements | position announcements | position announcements | position announcements | position announcements

Data Processing Professionals

Immediate Openings in Dallas, Houston & Lubbock

Immediate openings available in Dallas, Houston and Lubbock for both experienced and entry level applicants. Positions require a 4-year college degree and permanent U.S. residency or U.S. citizenship. Entry level positions require a major or minor in Computer Science.

General Business Applications Programmer/Analysts
Design, develop, and implement systems in support of worldwide general accounting, financial planning, cost accounting, personnel, facilities and marketing functions. Experience with IBM 370, minicomputers, IMS, COBOL, or DL/1 applications preferred.

Manufacturing Systems Programmer/Analysts
Design, develop, implement and support shop tracking, production planning and quality tracking applications for worldwide manufacturing systems. Experience with IBM 370, minicomputers, COBOL, PASCAL, IMS or DL/1 applications preferred.

Scientific Applications Programmers
Develop and support computer aided design and interactive graphics applications. Experience with IBM 370, minicomputers, COBOL, FORTRAN, PASCAL, data base management, numerical methods and structured programming preferred.

Data Base Analysts
Design, develop and support IMS data bases and support programmers with consultation, debugging and design assistance. 3-5 years experience with DL/1 applications programming and IMS data base design required.

Data Base Development
Design, implement and support new CODASYL data base management system for the TI-990 series minicomputer with emphasis on support in a distributed processing environment. 5-8 years experience in data base systems implementation experience preferred.

MVS/JES 3 Operating Systems Internals
Modify and troubleshoot IBM operating system. 3-5 years experience with IBM operating systems and recent experience with MVS/JES 3 or TSO.

Office Automation Software Programmer/Analyst
Analyze, design and develop a word processing data processing minicomputer system with an emphasis on evaluation and enhancement of performance. 3-5 years experience in multi-tasking, disk-based operating systems using Assembly language.

Computer Scientist — PhD — Dallas
Advanced strategic evolution of Data Processing Technology and Systems Architecture. Develop practical programs to implement emerging technology. Anticipate future trends and capitalize on them. High internal visibility position with worldwide scope and large impact. A PhD in Computer science is required. Industry experience preferred.

If you wish to work in this highly motivating and challenging environment, send your resume in confidence to: John Heft P.O. Box 2103 Richardson, TX 75080. Or call (Collect (214) 238-3246.

TEXAS INSTRUMENTS
INCORPORATED
An equal opportunity employer M/F

Electronics Marketing/Sales Management Professionals:

Key In On A Digital Marketing Opportunity

An excellent opportunity exists for marketing/sales managers with a proven track record to impact the marketing activity of Digital's Engineering Systems Group. Digital Equipment Corporation is the world's leading manufacturer of minicomputers and an industry leader in interactive time-sharing.

A key position is presently open for an individual to direct Digital's marketing efforts in the IC, PCB design marketplace. Responsibilities of the MARKETING MANAGER-ELECTRONICS APPLICATIONS include the development and implementation of new marketing strategies, the management of joint marketing relationships with key industry vendors, and the promotion and support of electronics design systems.

Qualified candidates should have an EE degree or equivalent, IC or PCB design experience and a minimum of 3 years management experience in computer system sales or marketing.

These positions are located in Marlboro, Massachusetts an attractive suburban community just 30 minutes west of Boston. Here you'll enjoy the 4-season recreational attractions of New England — the seaside retreats of Cape Cod and the fantastic skiing on the slopes of New Hampshire and Vermont — and yet be close to the cultural and educational resources of the city. Add to this the state-of-the-art technologies environment of Massachusetts industry, plus excellent school systems and shopping centers and you come up with an extraordinary richness of life.

If you would like to investigate the challenges and opportunities that are waiting for you at Digital, please forward your resume, including salary history, to Carol Reed, Digital Equipment Corporation, Dept. G0218 3807, 200 Forest Street, Marlboro, Massachusetts 01752. We are an equal opportunity employer m/f.

digital

COMPUTER ENGINEERS

• SYSTEM SOFTWARE ENGINEER:

System Analyst to design computer application programs using languages SPL and COBOL. Requires experience of Data Base Management System and knowledge of Hewlett Packard Image DBMS. Familiarity with CODASYL, DBTG, DDL and DML as well as physical storage organizations such as ISAM, VSAM and compaction of data desirable.

• SYSTEMS HARDWARE ENGINEER:

Position requires maintenance and service of HP 3000 series II, model 8 computer hardware, including buildup and control of parts inventory. Training provided in domestic location.

Positions located in KINSHASA, ZAIRE. Single or married status; 24 month contract with option to renew. Excellent compensation package and benefit program. Candidates should have some knowledge of spoken and written French or willingness to learn.

Qualified applicants submit resume along with salary history to

CW Box 2213
375 Cochituate Rd., Rte. 30
Framingham, Ma. 01701

The Department of Computer Science at the University of Wisconsin-Eau Claire announces an Adjunct Instructor, Assistant or Associate Professor position to teach introductory and advanced level undergraduate courses starting August 25, 1980. Candidate must have at least a Master's Degree in Computer Science (Ph.D. preferred) with emphasis in system software and experience with high level languages including PASCAL. Competitive salary based on applicant's academic background and experience. Send inquiries including letter of application, resume, transcripts and three letters of reference by March 31, 1980, to:

David A. Hanna, Chairman
Department of Computer Science
University of Wisconsin-Eau Claire
Eau Claire, WI 54701

An Equal Opportunity/
Affirmative Action Employer

DATA COMMUNICATIONS PROFESSIONALS

The United States Senate requires Senior Data Communications Systems Professionals for development and enhancement of its Data Communications Network. A unique environment exists working with a highly skilled technical staff. State-of-the-Art hardware and networking techniques are being implemented in an extensive local and long haul Network. Candidate should have ten (10) years Data Communications experience preferably with management responsibilities. Bachelor's degree required. Knowledge of tariffs and data services, communications processors, software, technical control equipment, terminals and other Data Communications equipment with experience in Network Design, implementation and operations a required. Excellent benefits. This is not a Civil Service job. Salary commensurate with ability.

SEND RESUME TO:

Manager, Data Network
U.S. Senate Computer Center
400 N. Capitol St., G-Level
Washington, D.C. 20510
(202) 224-1600

SENIOR PROGRAMMER/ANALYST

NORC is a survey research firm located on the University of Chicago campus. We need a person to plan and implement all DP activities for a survey using existing software and to develop new software systems. Minimum of 3 years programming. Knowledge of structured design and programming — especially FORTRAN and/or COBOL, IBM 370 operating system, JCL, WYLBUR, file management, and SPSS. Must be able to work independently and possess strong oral communication skills.

Send Resume to:

Personnel Department — Employment
National Opinion Research Center
6030 South Ellis Avenue
Chicago, Illinois 60637

Programmer Analyst

Due to a growth record of 20-25% per year, we now have a position available for a Programmer Analyst.

The successful candidate should have 3 to 5 years experience with a manufacturing company preferably with a system 3 model 15D or model 34. A knowledge of CCP and/or BOMP is desired, but not necessary. We are located 15 minutes south of Newark airport. If you wish to explore this opportunity, send resume including salary history to: PERSONNEL MANAGER

HAYWARD MANUFACTURING CO.
900 Fairmont Ave., Elizabeth, N.J. 07207
An Equal Opportunity Employer M/F

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 700 FRAMINGHAM, MA 01701

postage will be paid by

CIRCULATION DEPARTMENT

COMPUTERWORLD

375 Cochituate Road, Rte. 30
Framingham, MA 01701

Detach here, moisten and seal envelope securely before mailing

Fold and insert order form (attached through binding) and remittance here.

position announcements | position announcements | position announcements | position announcements | position announcements

IBM S/3 MODEL 15D
PROGRAMMER/ANALYST
CHEYENNE, WYOMING

Immediate opening for the right individual with the following qualifications:

- Minimum 2 yrs. experience on IBM S/3
- RPG II and Cobol
- CCP experience definite asset
- Banking knowledge desirable
- Ability to work projects from design stage thru documentation
- Able to communicate effectively with user departments

If you have these qualifications we can offer you an excellent position in a growing bank with excellent employee benefits. Cheyenne is a growing western city of 40,000 located near the Rocky Mountains, only 90 miles from Denver, with fine outdoor recreation.

Please send current resume, with salary history, salary requirements and availability to:

Personnel Officer
AMERICAN NATIONAL BANK
P.O. BOX 1530
Cheyenne, Wyoming 82001
An Equal Opportunity Employer

Technical

FE's/ PSR's/ SE's

You can qualify with just a phone call. Team up with Magnuson's new strategic architecture serving 370 installations. If you missed Xerox in the 60's, Memorex in the 60's or Amdahl in the 70's, don't miss Magnuson in the 80's. Join a growing company — a new leader in the computer field.

Total Support Reps
Hardware and Software Professionals

Responsibilities will include coverage of our CPU installed bases with openings in the New Jersey, Atlanta, Kansas City, MO, New York City, Phoenix, Boston, Houston, Detroit and Washington, D.C. areas providing Magnuson Computer Systems customers with hardware and software support.

We are interested in VM, OS/VS1, DOS/VS, MVS professionals and 360/370 I/O and CPU Field Engineers.

We offer ground floor growth opportunity and our compensation and benefit package includes company paid medical, dental, hospitalization, life insurance and free prescription drugs. Our salaries are very competitive.

Please submit your resume to **Bill Pugelli or Matt Howse, Magnuson Computer Systems, 2962 Orchard Parkway, San Jose, CA 95134. Or call them collect at 408/946-8100.**

Magnuson Computer Systems
An Equal Opportunity Employer

SETTLERS GUIDE TO TEXAS

All trails lead to INFORMATICS, INC and TEXAS, for that challenging new job opportunity you are looking for and a great new area for you to explore!

INFORMATICS, INC. is a young and dynamic organization providing consulting and programming services to major companies throughout the United States. As a leader in our field, we continue to enjoy success and growth and know there are many more good things to come! Professional positions are available in our HOUSTON and DALLAS offices for EXPERIENCED PROGRAMMER ANALYSTS, with an IMS background preferred. At INFORMATICS you will be working in a creative environment with exposure to state-of-the-art technology on a daily basis. Our salaries are above average and we provide an outstanding benefits package.

In TEXAS our settlers enjoy short, mild winters and sunshine 70% of the year; professional baseball, football, and basketball teams; nationally acclaimed museums and theatres, great recreational activities and excellent institutions of learning.

BLAZE YOUR OWN TRAIL...come to Informatics and Texas!

Interested applicants should CALL COLLECT (214)696-1900, or forward a resume to:
Micky Johnson
Informatics, Inc.
Professional Services Group
Western Division
10300 N. Central Expressway, Building II
Dallas, Texas 75231

informatics inc

Equal Opportunity Employer M/F

DP SALES AND MARKETING

Nationwide professional consultants specializing in sales, sales management, and marketing for hardware, software, and peripheral companies. Opportunities at all salary and experience levels. Confidentiality guaranteed.

For consideration and further information, send resume and salary history to **James J. Hohman, I.R. ASSOCIATES, Highland Office Center, Suite 400, 600 Pleasant Rd., Fort Washington, PA 19034, (215) 643-5730.**

NEW ENGLAND NATIONWIDE

Through years of EDP specialization in the heart of New England, we have developed a broad base of industrial, insurance, banking and service clients with openings to every level, including:

SYSTEMS PROGRAMMERS .....To 35K
PROJECT LEADERS .....To 30K
SYSTEMS ANALYSTS .....To 30K
PROGRAMMER/ANALYSTS .....To 28K

And if New England's not your cup of tea, we offer openings across the country through our affiliation with NATIONAL PERSONNEL CONSULTANTS.

Nationally, companies pay all fees, interview and relocation expenses.

Send resume or call (collect) A. J. Hoshek at (413) 781-0882.

dps SPECIALISTS
DYNAMIC PERSONNEL SYSTEM
101 Park Avenue
West Springfield, MA 01089

PROGRAMMER/ANALYST

Applicant must have minimum of three (3) years' experience as Analyst/Programmer plus two (2) years other data processing experience. Language requirements include Cobol, with ALC or RPGII on asset. Experience with insurance industry would be beneficial. Firm utilizes IBM 370/138 DOS/VS. Send resume and salary requirements to personnel office,

Blue Cross of Montana,
P.O. Box 8004,
Great Falls, Montana 59405
Phone (406) 761-7310
An Equal Opportunity Employer

Director of the Computer Center

(Salary commensurate with qualifications and responsibilities) Responsible to the Executive Vice President for the management of personnel, finances, equipment, development, and implementation of programs policies and procedures related of the entire operation of the campus Computer Center. Experience in development of hardware and software specifications for data base management. Equivalent to five years of progressively responsible experience, two years of which has proven management experience within a data processing environment, including responsibilities in supervision of personnel and budget planning and administration and managing the integration of hardware and software systems. Closing date 3/21/80

For official application contact the Personnel Office, California Polytechnic State University, San Luis Obispo, California 93407; (805) 546-3326. Affirmative Action/Equal Opportunity/Title IX/Rehabilitation Act of 1973 Employer.

SYSTEMS ANALYSTS AND PROGRAMMERS

Job dissatisfaction, complacency, and frustration are the biggest obstacles of everyone of ambitious one's career goals — and, many being challenged by our goals. Everyday new career opportunities pass us by because we are unaware of their existence. Let us keep you abreast of what your true value is in the market place. Absolutely no obligations, please call or write Keith Ritchie, Data Processing Specialist.

The Personnel Consultant System
Dunhill
of CHARLOTTE, INC.
One Fairview Plaza, Suite 400
7600 Fairview Road, Charlotte, NC 28210
(704) 554-8777

SYSTEMS/PROGRAMMER ANALYST

Several recent promotions have resulted in openings in our systems group for experienced applications programmer/analysts. Responsibilities of these positions include the design, programming and implementation of new systems applications and modifications to existing applications. Extensive interface with users is required in the definition of systems objectives, establishment of detailed specifications and the preparation of project control documentation.

The candidates for these positions will be college graduates with degrees in Business Accounting, Engineering or Computer Sciences, and have 2 or more years of experience in business systems analysis in a manufacturing environment. Proficiency in COBOL is essential. Knowledge of data base and data communications concepts, real-time systems design and control, project management and/or UNIVAC specialized software will be strong plusses. The successful candidate will be highly motivated, well organized and possess good communication and interpersonal skills.

If you are such a data processing professional, and are seeking challenge and opportunity, we may have the right career path for you. In addition, we offer a highly competitive salary and liberal fringe benefits. To apply, please send your resume complete with salary history, in confidence at

J. Donald Hylton
Personnel Superintendent

CONSOLIDATED ALUMINUM
P.O. Box 164
Hannibal, OH 43931

An Equal Opportunity Employer M/F/H

position announcements | position announcements | position announcements | position announcements | position announcements

Anyone can find jobs in data processing. But, the really good positions are hard-to-find.

Robert Half offices have specialized in finding the best edp positions for more than 30 years . . . since it all began. We have 70 conveniently located Robert Half offices in the United States, Canada and Great Britain. Look us up in the White Pages.

ROBERT HALF
data processing and financial personnel specialists

ALBUQUERQUE • ALLENTOWN • ATLANTA • BALTIMORE • BIRMINGHAM • BLOOMINGTON (MN) • BOSTON • BUFFALO • CHICAGO • CINCINNATI • CITY OF COMMERCE (CA) • CLAYTON • CLEVELAND • CLIFTON (NJ) • COLUMBUS • DALLAS • DAVENPORT • DAYTON • DENVER • DES MOINES • DETROIT • FORT WORTH • FRESNO • GRAND RAPIDS • GREENSBORO • HARTFORD • HAYWARD • HOUSTON • INDIANAPOLIS • KANSAS CITY • LANCASTER • LEXINGTON • LONG ISLAND • LOS ANGELES • LOUISVILLE • MEMPHIS • MIAMI • MILWAUKEE • MINNEAPOLIS • NEW ORLEANS • NEW YORK • OMAHA • ORANGE (CA) • PALO ALTO • PHILADELPHIA • PHOENIX • PITTSBURGH • PORTLAND • PROVIDENCE • SACRAMENTO • ST. LOUIS • ST. PAUL • SALT LAKE CITY • SAN ANTONIO • SAN FRANCISCO • SAN JOSE • SCHAUMBURG (IL) • SEATTLE • STAMFORD (CT) • TAMPA • WASHINGTON, D.C. • WILMINGTON
• CANADA: CALGARY • TORONTO • VANCOUVER
• GREAT BRITAIN: BIRMINGHAM • LONDON

MANAGER, TECHNICAL SUPPORT

Assume hands-on responsibility for Systems Programming, Data-center technical support and terminal network user support. If you are a DOS/VS and C.I.C.S. heavyweight and have at least 5 years experience in Data Processing, we want to talk to you. Our near term plans include the installation of an IBM 4341 and major upgrades in the software area. We need a leader to help us get there. If you think you qualify, call us...

UNIJAX, INC.
Manager, Staffing & EEO
P.O. Drawer J
Jacksonville, Florida 32203
904-389-3181
EQUAL OPPORTUNITY EMPLOYER

PROGRAMMER ANALYST

Immediate opening for a highly-motivated professional to join a dynamic group designing and implementing on-line systems in a RSTS/E environment. Extensive programming experience required, preferably in Basic + and/or Basic + 2 and RMS. We offer state-of-the-art hardware and software; an excellent salary; fringe benefits; and the opportunity to live in northern New Mexico's high country!

You may call Richard Sofaly (collect) at (505) 662-4122, Ext. 63, or send resume to:

Personnel Department
LOS ALAMOS COUNTY
P.O. Box 30
Los Alamos, NM 87544

An Equal Opportunity Employer M/F

Systems Programmer

Television Communications...

There's A Future In It

We're Harris Video Systems, a leader in the state-of-the-art Television Communications industry. Because of the on-going demand for our high performance products we must expand operations in order to keep pace.

Will design, develop, evaluate and modify computer programs for the solution of engineering problems. Will serve as liaison on specific projects between engineering, marketing, product support and customers. This position reports directly to the Chief Programmer.

A BS in Computer Science or the equivalent is required plus 3-5 years experience in Assembly language programming and documentation for mini and microprocessor controlled product applications. Candidate must possess strong communication skills.

We're offering a career that's designed for the future, and if that's what you're seeking, please send your resume in confidence to: **Employee Relations Manager, 1255 E. Arques Avenue, Sunnyvale, California 94086.** Or call K. Marineau at (408) 737-2100. We are an equal opportunity employer m/f/h.

HARRIS

DATA PROCESSING MANAGER FOR SYSTEM 34 INSTALLATION

3-Person Dept. — Involves specialty machine shop and product marketing. Requires (2) yrs. minimum experience in RPG II Programming & OCL. Must be experienced data entry operator. Working knowledge of System 34. Knowledge of MMAS packages helpful. Position requires person adept at operating & programming besides managing. Located in Northern Michigan's Upper Peninsula. Good skiing & winter sports area — excellent hunting & fishing also.

Please send resume and state salary requirements to:

D. A. MacPherson, Inc.
County Road 608
P.O. Box 32
Iron River, Michigan 49935
Phone (906) 265-6167

SEA ISLAND COMPREHENSIVE HEALTH CARE CORPORATION

Rt. 3, Box 225, John's Is.
South Carolina 29455
Telephone: 803-556-0993

COMPUTER PROGRAMMER

Salary Range: $17,000-21,300

Requirements: Individual should be able to develop computer programs for input and retrieval of medical, dental and other data. Prepare modification and operating procedures for new programs. Codes programs, makes computer runs and prepares operating documentation. Writes programs for classification, indexing, storage and retrieval of data and facts, display devices and interfacing with other systems equipment. Should have skills in the management of data information as well as the management of personnel working with data information system.

Qualifications: Graduation from an accredited university with a BS degree in computer science preferred. Should have at least two years experience working as a programmer.

Send resume to Mary Frances Brown, Personnel Director, Sea Island Comprehensive Health Care Corporation, Rt. 3, Box 225, John's Island, South Carolina, 29455.

EQUAL OPPORTUNITY EMPLOYER

Marketing/Computer Performance Analyst

An outstanding opportunity currently exists for a talented individual to join Digital Equipment Corporation — the world's leading producer of interactive computer systems. Here you will utilize your technical, marketing, and communications skills contributing as a member of a high-visibility, high-impact marketing team.

Working with our top marketing and engineering professionals, you will utilize our most comprehensive performance measurement facility to measure and characterize Digital's most successful RSTS Systems for commercial applications.

The individual we seek will possess a technical degree, or equivalent. Experience with RSTS, programming, and systems design, as well as good presentation skills, are essential.

If you are interested in this challenging opportunity with one of the most successful computer companies in the world, please forward your resume, and salary history, to Gary Hughes, Digital Equipment Corporation, Dept. H0218 3807, Continental Boulevard, Merrimack, New Hampshire 03054. We are an equal opportunity employer m/f.

digital

HELP WANTED

PROGRAMMER — Salary range $11,976 - $17,700. Up to $10,000 to start for fully qualified RPG Programmer. We may consider providing training in RPG-2, if highly qualified in other language. College degree in Computer Science, or related field plus 1 year experience as a programmer or any equivalent combination of experience, education, training in programming, operations, computer science or related field. Applications and job information available at (tel. 888-888-8888) County Personnel Office, Room 207, County Courthouse, Las Cruces, New Mexico 88001. Submit resume. Closing date: February 25, 1980. AN EQUAL OPPORTUNITY EMPLOYER

COMPUTER SCIENCE FACULTY POSITION

Four year, church related, accredited, liberal arts college seeks a faculty member to teach in a growing computer science program beginning September 1, 1980. Preference will be given to candidates with PhD. in computer science but will consider persons with a Master's Degree. Experience or education in management and or business administration a plus. Aurora College has a PDP 11/70 computer with RSTS/E operating system. Send vitae to M.E. Bailey, Director of Computer Science Program, Aurora College, Aurora, IL 60507. An equal-opportunity/affirmative action employer

position announcements | position announcements | position announcements | position announcements | position announcements

DATA PROCESSING PROFESSIONALS

A major financial institution with its ADP Center in the Los Angeles, California area has positions available that provide personal growth and career advancement.

SR. SYSTEMS REVIEW ANALYST

We are seeking a Sr. Systems Review Analyst, with a corporate title of Assistant Vice President to conduct quality assurance reviews of software applications as they progress through the various development stages.

The selected candidate will possess a minimum of 8 years experience in applications software development and support for a branch banking institution. A minimum of 3 years of the above experience in a project management capacity is also desired. Familiarity with MVS/OS, life cycle development methodologies, structured programming and analysis, on-line systems, database concepts and mini-based or distributed systems. Excellent communications skills, both written and verbal and the ability to interact with all levels of personnel required. Salary to mid $30's.

CPCS APPLICATION CONSULTANTS

Selected candidates will serve as staff assistants to the managers of development projects. A minimum of 5 years data processing experience and knowledge of IBM Check Processing Control System using 3890 MICR reader/sorters. Positions offer excellent opportunities to advance into management as well as the challenges of solving complex check processing problems. Starting salary in the low to mid $30's.

CPCS SR. PROGRAMMER/ANALYSTS

We are seeking qualified individuals for new development projects in Item Processing. 4 years of programming experience with a working knowledge of IBM's Check Processing Control Systems (CPCS). Applicants must have a strong programming background in BAL and COBOL. This is a unique opportunity for advancement into management. Environment includes Dual 3033's under MVS, TSO/SPF, VSAM and IMS.

Individuals interested in joining a company with modern facilities and a highly advanced D.P. environment, should send their resumes to

P.O. Box 4399 (M-9)
Glendale, California 91202

An Affirmative Action Employer

SYSTEMS ANALYST

BIO/DYNAMICS INC. a leading Life Science Laboratory, seeks a systems analyst to establish and support a computer activity in a toxicology laboratory. Successful candidate will have a B.S. in Computer Sciences with 3 years experience, or M.S. with 1 year, or extensive relevant experience designing and implementing data capture and processing (DEC — Vax System). Knowledge of systems and programming (Fortran) combined with creativity and enthusiasm are keys for exciting opportunity.

Please send resume including salary history to Ms. Mary Zeek, Director, Personnel, Bio/dynamics Inc., Box 43 Mettlers Road, East Millstone, New Jersey 08873. M/F EOE

INSTRUCTOR OF DATA PROCESSING

JOB DESCRIPTION:

Instruct lecture and laboratory courses in Data Processing such as Automated Accounting, Introduction of Data Processing, Operations, Data Entry and programming languages. Perform other duties and responsibilities in relation of program development, committee assignments, student club sponsor, etc.

QUALIFICATIONS:

Bachelor's degree in Computer Science or related field and a minimum of two years work experience in data processing required. Preference will be given to applicants with a knowledge of accounting principles and a master's degree in Computer Science and one year of related work experience.

Teaching experience at the post-secondary level is preferred, and some experience in developing and/or utilizing performance based objectives and self-paced instructional modules is desirable.

Must be able to relate to students and co-workers in a positive manner. Participation in faculty evaluation and development is essential.

SALARY:

Per Faculty Salary Schedule

STARTING DATE:

8/14/80 (Employment in Summer Session 1980 is a possibility)

METHOD OF APPLICATION:

Qualified applicants may apply at or call

Personnel Services
McLennan Community College
1400 College Drive
Waco, Texas 76708
(817) 756-6551, ext. 321 or 304

New England For The GOOD LIFE

ROMAC Can Make It Happen

Our offices in Maine, Massachusetts, Rhode Island and Connecticut serve the industry leaders. We are in daily contact with decision makers in Data Processing and never have there been so many excellent opportunities.

With 15 years of solid experience in serving the Data Processing field, we have the unique ability to assist and advise you on important matters such as a qualitative match, growth and advancement. Our reputation for competence and confidentiality is unsurpassed.

Call or write us in confidence.

Examples of typical opportunities are listed.

MIS DIRECTOR (near Hartford) Lead online development. Depth in manufacturing systems. Large Burroughs experience preferred. Full relocation. **$40,000**

SYS & PRGMG MGR (In Maine) Leading manufacturer in ski country. Capable staff. Solid Cobol, CICS, and manufacturing systems experience. **$35,000**

TECH MANAGER (In Massachusetts) OS 370 complex. Direct staff of six. Strength in MVS, VM, CICS, IMS, minis, and telecommunications. **$35,000**

BUSINESS SYSTEMS ANALYSTS (In Southern Connecticut) Several openings in Fortune 500 firms. Background in manufacturing and financial systems, and hardware experience on large scale IBM and HP 3000. Salaries **$25-$35,000**

D P MANAGER (In Rhode Island) Rapidly growing firm. Develop & implement MRP systems on 4331. Proven leadership skills. MBA preferred. **$32,000**

ROMAC
& ASSOCIATES/Personnel Consultants

FIVE ROMAC OFFICES In Strategic New-England Locations	One Financial Plaza Hartford, CT 06103 (203) 525-8037	2 Sun Life Park Wellesley Hills, MA 02181 (617) 235-4011
140 Sherman Street Fairfield, CT 06430 (203) 255-9145	477 Congress Street Portland, ME 04101 (207) 773-4749	1150 New London Avenue Cranston, RI 02920 (401) 463-7600

UNIVERSITY OF IOWA

The Weeg Computing Center at the University of Iowa has an immediate opening for a Manager of Computer Operations. The Weeg Center is a large multi-faceted operation serving the research and instructional needs of the University. Currently installed equipment includes an IBM 370/168, four PRIME 750s, and four HP2000 systems. We are seeking an individual with leadership potential. Emphasis will be on the development of operational policies, procedures and a comprehensive training program for operations personnel. Previous operations experience, preferably on an IBM environment, is required. Send resume and salary history to:

Robert Ontjes
Weeg Computing Center
University of Iowa
Iowa City, IA 52242

The University of Iowa is an equal opportunity/affirmative action employer

SYSTEMS PROGRAMMER

Clarkson College of Technology has an opening for a Systems Programmer having 2-3 years experience with a major IBM system. Responsibilities will include generation, support, and enhancement of VM/370 and OS/VS1 on an IBM 4341, which will be installed in June, 1980. Experience with telecommunications processing is desirable.

The position offers an excellent benefit package and a competitive salary. Our employees are encouraged to enter Bachelors, Masters and Doctoral degree programs. Please send resume and salary requirements at

Mr. Richard D. Velonis
Assistant Director
Computing Center
Clarkson College
Potsdam, NY 13676

An Equal Employment Opportunity/Affirmative Action Employer.

DALLAS

Technical Services Analysts

Billion dollar electric utility corporation with centralized DP operation needs experienced technical services analyst to design, code and maintain computer software. Responsibilities include analyzing software modifications and enhancements and installation and testing new or modified software.

MVS — At least one year experience in SMP PUT maintenance and Reading Memory Dumps required. Other desirable experience in ASM, PL1, CICS, VSAM, VTAM, FORTRAN or RJE.

Mail resume and salary history to Employee Relations Department. No agencies please

Central and South West Corporation

2700 One Main Place • Dallas, Texas 75250

An equal opportunity employer

position announcements | position announcements | position announcements | position announcements | position announcements

ACP ACP ACP

Walgreens, with sales in excess of $1.3 billion, is constantly upgrading their Data Processing environment to maintain a leadership position in the industry. This growth and expansion requires additional staff in the following areas:

▫ Systems Analysts

to design and implement our ACP system. Prior ACP experience and familiarity with the latest ACP releases is required.

▫ Systems Programmers

To qualify, you should have background and experience on ACP and its current releases. However, we will consider MVS experience in a communications environment or trainable applicants with IMS-DC or CICS or TCAM background.

Challenge in our Data Processing Group, our convenient north suburban location, excellent salary and fringe benefits, all make Walgreens the company to consider for excellent career opportunities. For confidential consideration, send your resume or call:

J. Nudelman
948-5000, ext. 2982

Walgreen Co.

200 Wilmot Road
Deerfield, IL 60015

An Equal Opportunity Employer M/F

IMS

• LEAD D.B.A.
• SENIOR D.B.A.'s
• PROJECT LEADER

Hobart Corporation, a leader in the manufacture of commercial food equipment and KitchenAid appliances, with World Headquarters in Troy, Ohio, is seeking qualified individuals to become members of our Systems Assurance Department.

We have just initiated a 5 year applications development plan to design, develop and implement 8 major business and manufacturing ONLINE IMS DATA BASE systems. This effort requires the Systems Assurance Department to expand in order to support our 3 Systems Development Departments. This Department provides control, coordination, communication and assistance to all other MIS departments. Their responsibilities encompass Data Base Administration, Data Dictionary Design and Administration, Design Methodology and Standards Administration, Systems Development Quality Assurance, MIS Staff and User Training and Education, and MIS organizational development.

Our technical environment consists of an IBM S370/3033; MVS; IMS DB/DC 1.1.5; Data Dictionary 3.0; CICS 1.4; TSO/SPF; SNA-SDIC; and multiple IBM 8100's.

The candidates for the DATA BASE ADMINISTRATOR positions should have a BS Degree and 2-7 years IMS experience with at least 1-4 years as a D.B.A.

The candidates for the PROJECT MANAGER positions should have a BS Degree; 5-10 years data processing experience; supervision or management experience; and experience with Data Dictionaries, Design Methodologies and Standards, Data Processing Education and Training and Design Reviews.

If you are interested in joining an aggressive implementation and support team, send your resume and salary history or call (513) 335-7171, Ext. 2212.

James L. Severs
Manager, Staffing and Development

HOBART

WORLD HEADQUARTERS TROY, OHIO 45374

We Are An Equal Opportunity Employer M/F

ROBERT HALF

PACIFIC NORTHWEST
Washington, Oregon, Idaho & Alaska

A great place to visit — a better place to live. Healthy economy and environment.

Managers
Auditors
Analysts
Programmers

Visiting here? Call collect, send resume or drop in to talk over current job openings and set up interviews for you.

Ray Magill, CDP
ROBERT HALF
of Seattle, Inc.
1301-5th Avenue
Suite 2530
Seattle, Wash. 98101
(206) 624-6000

Bob Clawson
ROBERT HALF
of Portland, Inc.
Personnel Service
1 SW Columbia
Suite 1400
Portland, Ore. 97204
(503) 222-0775

PORTLAND, OREGON
HCR — NEAT/3
PROGRAMMER/ ANALYST

New and progressive Bank Data Center has immediate need for programmer/analysts with strong NEAT/3 background. Banking and/or CIF background helpful. Send resume to Western BancData Center.

P.O. Box 20002, Portland, Ore., 97220
Phone - 503-220-6522

We are a large Southwestern Manufacturing Company with immediate openings for:

MANAGER
Application Analysis and Programming

Manage a group of approximately 50 analysts and programmers involved in the definition, design, development and implementation of data processing systems in a modern, progressive, high technology manufacturing company.

Organizational, planning and project management skills are especially important.

New applications include Manufacturing Planning and Control systems, Financial and Administrative, Factory Data Collection and distributed processing.

SUPERVISOR
Application Analysis and Programming

Supervise a group of 10-15 programmer analysts in the development of computer systems to support a complete engineering and manufacturing company.

We offer excellent company benefits. Please send your resume including salary history to:

CW Box 2216
375 Cochituate Rd., Rte. 30
Framingham, MA 01701

equal opportunity employer

Programmer/Analysts

If you think individual effort is important and want to work for a company that agrees with you... look no further.

M.I.S. International, a well established computer systems organization in its 10th year, is seeking ambitious professionals looking for a challenge. Our software product line includes financial and data base management systems, manufacturing and real time/process control systems.

Immediate openings exist in **southern Connecticut**, western New York, northern Ohio and southern Michigan for individuals with 3-5 years experience in:

- IMS, CICS, DMS, IDS, DMSII
- Real Time Programmers with backgrounds in data acquisition, process control, scientific/engineering
- Mini/macro computer systems engineers

M.I.S. International offers top of the line starting salaries for those with demonstrated expertise and regular increases based on individual merit. Our benefit package is second to none and relocations are provided if needed. For further information, call collect or send your resume to Mr. Gene Bryant to arrange for local interviews.

MIS INTERNATIONAL INC.
"A Total Systems Company"

24406 Southfield Rd
Room C
Southfield, Mi. 48075
(313) 562 6660

An Equal Opportunity Employer M/F/H

FLORIDA POSITIONS
PROGRAMMERS TO MANAGERS
$17,000 to $35,000

Due to rapid growth and the influx of many major corporations to the Florida market, the opportunities for Data Processing professionals in all applications fields have never been better. We at Hayden-Mitchell Associates have over 1000 current up to date openings plus many other positions coming open in the very near future, with companies that offer job stability, advancement, excellent benefits, and full relocation. We are in a position to market your specific skills in manufacturing, banking, financial or general business environment from micros to mainframes. Since we deal solely with Data Processing professionals, you can be assured that we will find you the position that will fit your qualifications and meet your personal and professional goals. All service charges and interview expenses are paid by our client companies leaving no financial obligation on your part. If you have been contemplating a move to sunny Florida or are now actively seeking a position in this area, contact the recognized professionals in this market by calling collect or sending your resume to Cliff Smith.

Hayden Mitchell Associates
304 N. Federal Way, Suite 234
Pompano Beach, Fla. 33062
305/942-5875 Mon-Fri 9-5

*Service charge assumed by client companies.

position announcements | position announcements | position announcements | position announcements | position announcements

MIS Professionals

Portland, Oregon

Expansion has created immediate needs within Evans Products Company, headquartered in Portland, Oregon. This Fortune 500 company, with 1979 revenues of $1.5 billion provides outstanding career opportunities to interested MIS professionals.

This is a state-of-the-art installation with IBM 3032 and communicating system 34's. We have major projects in the area of distributed processing, data base and on line systems.

We need strong, responsible individuals with the following:

1. Experience in face-to-face communication with users
2. COBOL and/or RPG II background
3. Exposure to top down structured development concept.

If you qualify and are interested in learning more about these positions located in the beautiful Pacific Northwest, please call me collect to discuss compensation and benefits or direct a resume to my attention: Chris Utter, Corporate Personnel Manager, Evans Products Company, 1121 Southwest Salmon, Portland, OR 97205.

(503) 222-5562

Equal opportunity employer m/f

Evans Products

SYSTEMS PROGRAMMER ATLANTA, GEORGIA

DeKalb General Hospital, located in suburban Atlanta, Georgia (Decatur), has an opening for a Systems Programmer. Applicants should have a minimum of 3 years experience in programming, know several languages (including FORTRAN and COBOL), and have experience with Prime computers. WE OFFER: Excellent benefits and salary-Educational Assistance-Recession proof industry. (Salary $16M-19M D.O.E.). If you qualify, send your resume or call Roy Thomas, DeKalb General Hospital, 2701 N. Decatur Rd., Decatur, Georgia 30033, (404)-292-4444 Ext. 5000. EOE.

PROGRAMMING

MAJOR AIRLINE
4 DAY WORK WEEK

We are currently recruiting for a number of programming and Sr. programmer analyst positions with this leader in the air travel industry. Positions require experience in either ANS COBOL or BAL programming languages. A background in 370/OS Systems would be desirable but not necessary. The company offers an extensive training Program in CICS programming methods. The hardware they are currently utilizing consists of two 370-158's running under MVS and utilizing CICS, PARS and ACP-II. The wide range of company paid benefits include FREE AIRLINE TRAVEL to anywhere in the world for yourself and members of your family. They also offer a dental plan, profit sharing cost of living index and a 4 day work week. Contact Neil Lang 201-369-0222 or submit resume in confidence to:

CENTRAL EDP
16 Bauer Road
Parsippany, N.J. 07862
Evening Interviews Arranged

SALES/MARKETING

TECH-ED SERVICES is a professional, technical recruiting and search firm. We locate and interview prime candidates for select openings with our client corporations.

We are currently searching for familiarity in:

SOFTWARE SYSTEMS
SOFTWARE SERVICES
MAINFRAMES/MINIS
GOVERNMENT ACCOUNTS
COMMERCIAL ACCOUNTS

Fully explore your career opportunities within the professional sales environment. Salaries commensurate with experience. Call or send complete resume and salary history to:

TECH-ED SERVICES
5020 Sunnyside Avenue
Beltsville, MD 20705
800/638-0254

FLORIDA STAFFING

availABILITY

FLORIDA
Average Temperature 75°
No State Income Tax

BANKING PROGRAMMER ANALYSTS AND SYSTEMS ANALYSTS
Experienced with IBM Burroughs or NCR using COBOL or Assembler
CREDIT CARD
TRUST
DEMAND DEPOSIT
ATM
SAVINGS
LOANS
STOCK
CIF.

LIFE INSURANCE PROGRAMMERS & ANALYSTS
Life Silver Pkg exp a must. IBM OS or DOS COBOL A/or Assembler Salaries to $30K + Benefits!

DATA BASE DESIGNERS to $34K
IMS, IDMS TOTAL

DP EDUCATION TRAINER-$25K
Prefer exp with IBM hdwr/Silver

SYSTEMS PROGRAMMERS DOS/VS, VSE, OS VS, MVS, IMS to $30K
Internals, Real Time Communication Processors, I/O Drivers, Etc.

DP CONSULTANTS
IBM Exp'd to $40K
Hospital or Bank systems design exp + degree req'd.

COMMERCIAL PROGRAMMERS & ANALYSTS
Minimum of 1 Yr exp using IBM DOS or OS, Burroughs, or NCR Hardware and Cobol, BAL, PL/1 or NEAT/3. Pluses are VSAM, DL/1, CICS, IMS

AVAILABILITY, INC.
813 872 2831
Dept C, P.O. Box 25434
Tampa, Florida 33623

MIS DIRECTOR

Growing manufacturing company in southeastern New England is looking for an aggressive MIS Director to accept the challenge of developing new on-line management information systems. Individual should have five to seven years of EDP experience and must be able to work well with all levels of management. Salary in low $30s. Write in confidence to:

CW Box 2211
375 Cochituate Rd., Rte. 30
Framingham, Ma. 01701

IBM Info Systems/Midwest TO 40K
Mfgr seeks Hi-level mgt exp w/hvy mfg systems bkgd. IBM & user/mgt interface reqd. MBA+.

MIS of STS & Prog/.w PA TO 40K
Sys & prog mgt exp w/PROPERTY/CASUALTY insur bkgd reqd. Database & to estimate hdgs Respons for sys eval & development.

Software Engineer/PhD TO 30K
Microprocessor bkgd w/Z 80 or 8080 exp req. BAL helpful. Ground floor opply w/growing DP shop

Prog/Analyst/PhD TO 25K
Programming exp w/NEAT 3 on NCR CRITERION. Fin apps bkgd phd. Develop into analyst

For full details of any of our FEE PAID positions, please call for immediate interview appointment or forward resume to our Recruitment Specialist. Completely Confidential

ROBERT HALF
OF PHILADELPHIA, INC.
2000 Market St., Suite 700
Philadelphia, PA 19103
(215) 568-4300

Data Processing Production Support Analyst

An opportunity to be an essential part of an enormous coal mining operation in Wyoming.

The Thunder Basin Coal Company operates one of the largest surface coal mines in the U.S. As a member of our expanding data processing staff, you'll be helping us manage an operation that's been likened to directing a biblical epic.

After completing a brief training program in Denver, you'll be based near Wright, Wyoming. Here you'll be responding to, analyzing, and solving problems, requirements and user requests. In the process, you will be regularly interfacing with division, corporate, and external resource groups. We are a subsidiary of Atlantic Richfield—with all that suggests in terms of growing room.

Our requirements are modest: substantial course work or a degree in Computer Science and/or two years of data processing experience. We look forward to giving you a full briefing.

Please send confidential resume to: Mr. Jack Kasper, Thunder Basin Coal Company, P.O. Box 406, Wright, Wyoming 82732.

ThunderBasinCoalCompany
A Subsidiary of AtlanticRichfieldCompany

An equal opportunity employer, m/f

SENIOR PROGRAMMER ANALYST

Work in growing information systems division of 452 bed, community hospital located in central California's beautiful recreational area near (3) three national parks. Department plans include sophisticated on-line distributed processing with DEC-20 and PDP-11 series. Need programmer with knowledge of Assembler Language. DEC preferred and (3) three to (5) five years of programming experience. Programming is all on line. Salary in twenties depending on experience. Excellent benefit package.

Send resume and salary requirements to:

Mr. Rodney Gay,
Manager of Systems & Programming
Fresno Community Hospital
P.O. Box 1232, Fresno, Calif. 93715
(209) 442-4000 ext. 3712

An Affirmative Action, Equal Opportunity Employer

MIS PROFESSIONALS
SUNBELT LOCATION

The Fortune 100 Corporation has immediate career opportunities for the MIS professionals seeking visibility, technical development and rapid advancement. These positions have been created as a result of internal promotions and continued expansion of the information system organization. You will have the opportunity to enjoy working in a dynamic environment utilizing IBM's most current state-of-the-art technology.

- Systems & Programming Manager - Salary to $55,000
- Sr. Business Systems Consultant - Salary to $54,000
- Project Manager - Materials Management Systems - Salary to $54,000
- Systems Consultant - Materials Management Systems - Salary to $54,000
- Project Leader - Financial Systems - Salary to $50,000
- Data Base Administrator - Salary to $54,000
- Sr. Systems Analyst - Materials Management Systems - Salary to $50,000
- Sr. Systems Analyst - Financial Systems - Salary to $54,000
- Sr. Systems Analyst - Manufacturing Systems - Salary to $50,000
- IMS Data Base - Salary to $51,000
- EDP Audit Specialists - Salary to $54,000
- Sr. Systems Analyst - Salary to $50,000
- Sr. Programmer Analyst - Salary to $50,000

We offer excellent benefits along with the opportunity to enjoy year-round outdoor recreation. Send your resume in confidence to:

CW Box 2215
375 Cochituate Rd., Rte. 30
Framingham, MA 01701

Our client is an Equal Opportunity Employer M/F/H

position announcements | position announcements | position announcements | position announcements | position announcements

EXECUTIVE POSITION U.S. DEPARTMENT OF THE INTERIOR

Applications are being accepted for the following top management position, located in Washington, D.C.

DIRECTOR, OFFICE OF INFORMATION RESOURCES MANAGEMENT

Responsible for policy guidance and program direction for the full range of information resources and systems within a Cabinet-level agency. Functional areas of responsibility include ADP systems, wordprocessing, telecommunications, libraries, and all management information systems. Applicants must have significant program management experience and technical expertise relevant to the above areas. Excellent communication skills are also required. Detailed qualifications requirements are outlined in Vacancy Announcement No. 80-2(E) which may be obtained by calling (202) 343-6618. This position is in the Senior Executive Service with starting salary between $47,800 and $60,112. Relocation expenses may be authorized. To insure consideration, submit Standard Form 171 to the Personnel Officer, Office of the Secretary, Room 5446, Department of the Interior, Washington, D.C. 20240 by March 7, 1980. Please reference the vacancy announcement number.

An Equal Opportunity Employer

DATA PROCESSING

Are you interested in a professional career opportunity in a "State of the Art" shop with IBM 370-148, DOS/VS, COBOL, PANVALET ON-LINE, EASY TRIEVE, working toward DOS/-VSE? If yes, the following positions are currently available:

PROGRAMMER/ANALYST
$18,200 to $20,240

PROGRAMMERS
$14,200 to $20,072

Salary dependent upon qualifications. CICS/VS experience a definite plus. Benefits include paid holidays, vacation, retirement/disability program, health and life insurance, plus other optional benefits such as deferred compensation, credit union, etc. Send resume or call:

312/682-7344

DuPage County
Personnel Department
3rd Floor
421 No. County Farm Road
Wheaton, Illinois 60187

SAN FRANCISCO AND BAY AREA

PROJECT LEADER. Prior design/systems in manufacturing environment. Order entry, inventory, cost of goods sold, etc. Need solid 370 COBOL. IMS expertise — 30% travel.

RPG II PROGRAMMER/ANALYST. Need a take charge, experienced programmer who can pick up the ball and run with it. To $22,000.

DB PROGRAMMER/ANALYST. Solid Cobol DOS/VS. Financial and Manufacturing background in Data Base with solid communications exp. To $22,000.

ANALYST/PROGRAMMER. Needed by progressive financial institution. Requires COBOL in 370 DOS environment with Personal Control Applications background. Excellent opportunity, excellent remuneration. To $22,000.

EDP AUDITOR MBA or Accounting, 5 yrs auditing and 5 yrs DP. Languages are COBOL, MAPP, IV, Assembler and RPG II. Exceptional opportunity with solid company. To $22,000.

MANDATA BASE ANALYST. Very large state-of-the-art financial institution seeks a person with heavy IMS data experience/DB-DC. Will join a dynamic group. To $[illegible]

This is a sampling of the kinds of opportunities we have available for the right candidate. Call collect or send your resume in confidence to our offices and we can discuss top opportunities vis-a-vis your background and career goals.

PERSONNEL SERVICES MANAGEMENT PAYS ALL FEES.

ROBERT HALF OF NORTHERN CALIFORNIA
EDP SEARCH SPECIALISTS

Sally Anderson or
Bob Gooch
415-[illegible]-1000
111 Pine Street suite [illegible]
San Francisco, Ca. 94111

Dick Abrams or
Jim Rogers
415-[illegible]-8700
[illegible] Alto Sq. 2212
Palo Alto, Ca. 94306

Sixty Offices Nationwide
Client companies assume our charges.

We'll keep you up to date

week, after week, after week, after week, after week, after week,

Subscribe Yourself.

COMPUTERWORLD

SOFTWARE DEVELOPMENT MANAGER

We are looking for an outstanding individual to manage all program development for our growing software products firm. As the leader of our development team you will supervise the use of state-of-the-art program design and implementation techniques for the development of sophisticated user-oriented, interactive software packages for business planning, analysis and reporting in a variety of leading operating system environments.

In addition to supervisory experience and skills, this position also requires meaningful prior FORTRAN or PL/1 applications design/development experience. Experience in managing structured development activities is a definite plus.

We are a growing company which offers challenging assignments, a results-oriented environment and competitive salaries & benefits.

Please send resume and compensation requirements to:

President
TRINEWARE
[illegible] Lytton Avenue
Palo Alto, CA 94301

DP PROFESSIONALS

UNPRECEDENTED SUNBELT OPPORTUNITIES

American Bankers Insurance Group, a leading carrier of insurance needs to public and financial institutions, has immediate openings for the following:

SYSTEMS ANALYSTS

Previous life or property-casualty experience required. 5 years heavy analysis and design background, using COBOL on IBM hardware, knowledge of product development methodology helpful. Must be able to interface with all levels of management.

PROGRAMMER ANALYST

3-5 years programming experience in RPG, insurance background desirable. PMS experience a plus.

In addition to our "country club" location in suburban Miami, we offer an excellent compensation and personal benefits program. For immediate consideration, please send resume in complete confidence to:

AMERICAN BANKERS INSURANCE GROUP
Human Resources Department
690 Brickell Avenue
Miami, Florida 33131

An Equal Opportunity Employer M/F

MVS PROFESSIONALS
For Assignments in Germany
$60,000 - $70,000 per year plus relocation expenses

Our client is building a team of highly experienced MVS professionals in a scenic area of Germany.

Immediate openings for several positions are available for 12 month assignments to start with [illegible].

Your options include:

SENIOR SYSTEMS ANALYSTS
SENIOR SYSTEMS PROGRAMMERS

More than 6 years experience with MVS, TSO, CICS, IMS, JES2/3, SMA, etc. is required.

To arrange an interview on March 8 in Los Angeles, please, send your resume (incl. curriculum vitae, educational and professional career with emphasis on MVS experience) immediately to:

[illegible]
P.O. 30-51
D-[illegible] Düsseldorf 1
Germany

(Applications will be kept confidential)

NEW ORLEANS POSITIONS
$13-30,000

Come live in the South's most interesting city. Programmers or Managers are needed. If you are a Data Processing professional with a desire to live in New Orleans, I would like to make you aware of the many fine positions available here. All fees, interviewing and relocation expenses paid. Come visit and play in the South. Call or write in confidence:

Joe Roland (504) 527-5722
Data Processing Specialist
Professional Staffing, Inc.
P.O. Box 6775
Metairie (New Orleans), LA 70011

SENIOR PROGRAMMER ANALYST
$20,200 - $24,312

This senior position offers visibility and challenge for the experienced professional. Opportunity for growth into areas such as Project Management, DBMS, and Distributive Processing utilizing microcomputers. The successful candidate's background will include 5+ years of Programming and Systems Analysis work with recent on-line experience (TOPS-10, TOPS-20 or other time-sharing systems). The Hartford area offers a high quality of life without city or state income taxes. Please send resume by February 29, 1980 to:

Hartford Public School
Personnel Department
249 High Street
Hartford, CT. 06103.

Queries about the position should be directed to Mr. Daniel Kalagher, Software Development Manager (203) 566-6615.

An equal educational opportunity and affirmative action employer, M/F

LOCAL and NATIONWIDE

hundreds of openings ... all levels with top companies of all sizes and in all industries ... Competitive pay all fees.

Project Management/Leading
Senior Systems Analysts
Systems Analysts/Designers
EDP Auditors
Applications Programmers
Systems (software) Programmers
Scientific Programmers
Managers DS-34 RPG Shops

For more details, send your resume, or call:

Mark Potter
CADILLAC ASSOCIATES, INC.
[illegible] W. Washington St.
Chicago, IL 60601
(312) 368-0600

COMPUTER SCIENCE FACULTY

full-time for Sept. 1980 undergraduate classes and for curriculum development. Master's in Computer Science or closely related field required. $16,000 to $22,000 per academic year. Send resume's and graduate transcripts to Dr. Milburn, PDAAC, Embry-Riddle Aeronautical University, Regional Airport, Daytona Beach Fl. 32014. An Equal Opportunity/ Affirmative Action Employer.

SYSTEMS PROGRAMMER

Established, growing, well organized Service Bureau with dual 360-65's on-line system with Data Base Management system, needs an EDP Professional to manage our growing T. P. base.

Knowledge of DOS/VS type operating system, CICS type monitor, assembler and COBOL languages a must.

We are small enough to make your contributions count but big enough and growing to offer you many opportunities with a very competitive salary and a good benefit package.

Send Resume to: James A. Bedell, President, REPUBLIC SERVICE BUREAU, INC., 19110 Van Ness Avenue, Torrance, California 90501, (213) 320-0711.

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

4331
System Available for Immediate Delivery

3135
Immediate Delivery, Sale or Lease

3138
Systems Available, Sale or Lease

3145
All Configurations, Available Now

3148
Immediate Delivery, Sale or Lease

4341
Try a 370/155 or 370/158 Instead

3155
Immediate Delivery — w/DAT

3158
Most Configurations, Sale or Lease

3165
With DAT, Machines Available Now

3168
Machines Available, Sale or Lease

3031
2 Meg Available 1st Qtr 1980

3032
System for Lease — 6 Meg January

3033
3033-N4 • 3/15/80
3033-N6 • 8/15/80
Systems for Lease Only

470
Systems Available, Sale or Lease

Memory
145, 148, 158
168, 168, 168, 303X
IBM & OEM
Memory Available
Call Rosemary Geisler
312/698-3000

2880-2
Channels Available Sale or Lease

3330/40
Immediate Delivery Sale, Lease, Trade

3350
- Wanted to Purchase
- Available for Sale or Lease

3420
All Models Available Flexible Terms

3880
Control Units Available Now Lease Only

3704/5
3704-A1, 3705-E1
Machines Immediately Available. Call Karen Johns 312/698-3000

327X
Terminals, Printers & Controllers
Call
John Christopher
312/698-3000

3203-5
Printers Available Lease Only Limited Availability

Features
Many Features Available from Inventory

FOR SALE

HEWLETT PACKARD
COMPUTERS & PERIPHERALS
INCLUDES

2112 CPUS W/128K BYTES 2100 CPU, PRINTERS, DISCS, MAGTAPES, CABINETS, PAPER TAPE READER, PAPER TAPE PUNCH, CARD READER ETC.

CONTACT
ART MANNS
(213) 829-7511

-INVENTORY CLEARANCE-

IBM SYSTEM 3 MODEL 10
IBM SYSTEM 3 MODEL 8
BST 45 DRIVE/CONTROLLER
IBM 5496 DATA RECORDER
IBM 3284 PRINTER
IBM SYSTEM 7

MAKE AN OFFER

URS
Call: Bob Lusk
(617) 456-4300
50 Rockwell Ave.
Stoneham, MA 02180
Since 1969

DEC LSI-11 Components

Dependable service at discount prices

Domestic and Export

Mini Computer Suppliers, Inc.
25 Chatham Rd., Summit, N.J. 07901
Since 1973
(201) 277-6150 Telex 13-6476
©Mini Computer Suppliers, Inc. 1979

For Sale By Owner

DEC DS 310, 8KB, VT50, LA36, Dual Floppy Drive. Under Maintenance

Reply:
CW Box 2217
375 Cochituate Rd., Rte. 30
Framingham, MA 01701

FOR LEASE ONLY
IBM SYSTEM 3150
with the following features
1400 3rd Shift Man Cost
1434 10h Shift Man Cost
1435 9th Shift Man Cost
4100 Model III Upgrade
4000 IBC
6111 Reporter Separation
2150 IBC Control Store Ext.
2151 Expanded Control Store
IBM 3213-001 Printer Attach
7040 3210 Printer Attach
Available for Delivery
April 1980
10 to 24 month sub-lease
Call: 800/874-8240
Bobby Martin
Orlando Department Store

THIS SPACE FOR HIRE.

[Inquire at Classified Advertising Dept.]

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

SYSTEM
34
3/15
3741
3742
32
NOW!!
SOURCE
BOB LOSEY
(408) 688-0941

Take a used computer to lunch

A thought about used computers presented by CDA, Computer Dealers Association, an international non-profit trade association dedicated to promoting the advantages of used computers. For a membership roster and copy of our code of ethics, write to: Executive Director, Computer Dealers Assoc., 5635 W. Douglas Ave., Milwaukee, Wisconsin 53218 (414) 464-9230.

FOR SALE

Infotec Microcomputer
2 - 2600 IMP -
Single Drive System
CRT Unit
CPU Box
Printer on Stand

L. E. Tuttle
Chubb & Son, Inc.
3941 Kenny Road
Columbus, Ohio 43221
1-614-451-2262

For Sale

Basic Four 410
MOS CPU with 40k memory
10 MB disk cartridge
Centronics 101
Model 3100 Printer
2-7230 Video Display Terminals
Contact:
A. J. Donahue
National Electric Coil
941 Chatham Lane
Columbus, Ohio 43221
614/488-1200

DATAPOINT EQUIPMENT

AVAILABLE IMMEDIATELY

1-1133 System (3 Diskette Drives)
1-6232 Printer (80 cps)
1-4623 System (2-2½ MB Drives)
1-4220 System (2-2½ MB WANGCO)
1-6235 Printer (160 cps)

(602) 784-1711

Ask for
Johnson/Mason/Moran

MEMORY & COMPUTER REPAIRS

ANY MANUFACTURER'S MEMORIES
CORE — SEMI
DEC® — DATA GENERAL
COMPLETE CPU'S AND MEMORIES

- THREE DELTA CORP
1036 Kiel Court, Sunnyvale, CA 94086
(408) 734-5000
TWX-910 339-9511

SUPERIOR
NEW

IBM SYSTEM 34
IMMEDIATE DELIVERY

For Sale By Owner

System 3/12 Model B18
with: 3348-C2, 3277, 3741, 5203
Available: February 1980

Contact:
Cathy Johnston
Jarvis Cutting Tools, Inc.
Rochester, NH 03867
Tels: 603-332-2000 (in N.H.)
Outside of N.H., call:
800-258-7102

WANT TO BUY

3741 3277
3742 029-129

JMS COMPUTER ASSOCIATES
7 Roswell Street
Alpharetta, Ga. 30201
Call Greg Mosse
(404) 475-1600

Member Computer Dealers Association

FOR LEASE

IBM REMOTE CRT
5251-012
DUAL CLUSTER
EIA INTERFACE
KEYBOARD

Call
Jerry Sender
Leasing Dynamics, Inc.
216/867-9166

DATAGRAPHIX 4500 COM RECORDER

The recorder will be used as a training machine and at a later date may be used for spare parts.

Replies should detail configuration, age and condition of the recorder

Price quoted should include packing suitable for airfreight to Sydney, Australia.

Airmail replies to:

Mr. R Everyman
Computer Accounting Services Pty.
P.O. Box 100
Campbelltown NSW 2560
Australia

IBM
CARD READERS & PUNCHES
PRINTERS
CONTROLLERS

DIEBOLD
COMPUTER LEASING
(201) 569 3838

FOR SALE OR LEASE

3741s
3742s
ANY CONFIGURATION
30 to 45 day availability!

MERIDIAN SERVICES CORPORATION, INC.
7700 Alpha Computer Planning
N. E. Dallas Office, Dallas, Texas 75227
(214) 634-2760
TWX: 910-861-4171

DATA GENERAL DEPOT MAINTENANCE

Nova, Nova 800, 1200, Nova II, Nova III, DCC116, Keronix
CPU & Memory Depot Repair.
7 DAY Turnaround
"Race" (24 Hour Turnaround) Service Available
"Swap" Service On Request
60 Day Unconditional Board Warranty

For Additional Information
mini-maintenance, inc.
3929 Lincoln Court
Garland, (Dallas), Texas 75041

Contact:
Chuck Mikulski
(214) 271-1577

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

CMI

AMERICA'S LEADING SPECIALIST SERVING THE USED MARKET!

303X New and Used — Sale or Lease **3033-N8** 1st Quarter '80 Availability

3168 Several Configurations Available This March

3158 Sale or Lease Model 1's and 3s Attached Processors Bill Graham

3148 Models J & K Sale or Lease Pam Hoban

3138 Short Term Leases Feb. thru April Pam Hoban

4331 Your Position or Ours Call Now For Our Lease Plan Bill Watkins

4341 We want to Buy or Sale/Lease Your Machine We have Sixty '79 positions Gary Pollard

3155 3145 3135 3125 3115 Bob Southmont

OMEGA Don Dupuis

SYSTEM 3 Models 12 and 15 Danny Pennington

SYSTEM 34 All Models, Upgrades and Peripherals Available Now! Lloyd Marks

3277 3278 Printers/Controllers Terminals 3741 and 3742 Unit Record Kay Richard

360 CPU's 75B-50B Mario Beaner 2030 2040 2050 2065 and I/O Joe Romeo

3880 Sale or Lease Limited Quantities Also 3670 3675 3830 3850 3845 3850 Pat Callahan

I/O Available 2820-4 & 5 3505/3525 2311/2611 2914 2501 1442 Joe Romeo

Call 1-800-521-9648

CMI CORPORATION

Equipment For Sale

WANG 2200 SYSTEM 32K MEMORY	CALCOMP DISC DRIVES (IBM 3330 EQUIVALENT)
3 DISKETTE DRIVES PRINTER PLUS TELECOMMUNICATION CAPABILITY	2 MODEL - 1030 CONTROL UNIT 6 - MODEL 230 (DUAL SPINDLE) DRIVES 1 - MODEL 231 (SINGLE SPINDLE) DRIVE
AVAILABLE MAY 1980	AVAILABLE APRIL 1980

CONTACT: BARBARA FRYER

TRW UNITED-CARR

617-273-0770

S/34

Available Now!

Including:
- Model E35s
- 5260 retail systems
- Remote displays

DATALEASE CORPORATION

The IBM small systems financing specialists

Westport CT • (203) 226-9582
Cumberland RI • (401) 333-0240
Atlanta GA • (404) 455-1480

HAMPTON BUSINESS MACHINES CO.

A Division of DP Service Inc.
9550 N. Elston Ave. Chicago, IL 60630

Call: 312—774-2556

NOW SYSTEM 32—34

BUY — SELL — LEASE

IBM 3741 - 3742

Keypunches - Computers - Peripherals

Tom Holland Bill Broden

BUY — SELL — LEASE

ALL SYSTEM 34 CPU's AND PERIPHERALS

SALE OR LEASE

(23) System 34's Available Feb. - May

E35's w/3262 650 IPM Printer

Systems Can Be Configured To Meet Your Requirements Before Shipment

DATAMAN

P.O. Box 11288, Knoxville, Tn 37919
615-524-8610

BURROUGHS B711

For sale by owner
Available immediately

48KB memory
B9343 & cassette
L8000 & A8249
A9481 dual density disks

LUIS A. GARCIA
Banco Nacion Argentina
(212) 754-0300

370/145

Any Size Memory

(201) 569-3838

IBM 4331-J WITH 3370's

Available May, 1980
Contact: Jerry Borisy
(303) 988-0820

JBI ASSOCIATES, INC.
445 Union Blvd., Suite 303
Lakewood, CO 80228

Member: Computer Dealers Assoc.

FOR IMMEDIATE SALE

NCR 399, 20k memory, two cassette drives, assembler language, magnetic ledger cards with right rear eject, 35 CPS Printer with continuous forms feeder. Programmed for payroll, certified payroll, union reporting, accounts payable, job costing, general ledger and equipment costing.

FOR IMMEDIATE SALE

NCR 8230 Computer System, 80k memory, IMOS 68, 200 LPM printer, one each 5MB fixed disc, 5MB removable disc drive, additional 10MB fixed disc, two CRT terminals. Programmed in COBOL for payroll, accounts payable and general ledger.

Contact Dick Nelson or R.M. Hatley, P.O. Box 233, Council Grove, Kansas 66846 or call 316-767-5164.

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

CB COMPUTER BROKERS, INC.
2970 SHELBY STREET
MEMPHIS, TENNESSEE 38134
AC 901 373-2622
MEMBER - CDA

- SELL
- LEASE
- BUY
- RENT

3,32,34

LEASING?

SUBLEASE AVAILABLE

3031-2, 3017, 3036	FEB '80
3148-K, ISC, 2150, 6111, 3047	MAR '80
3031-2, 3017, 3036	MAR '80

POSITIONS AVAILABLE

3033 N8	February 15, 1980
3033 N4	March 14, 1980
3033 N8	March 21, 1980

- We'll write a short term or long-term lease — on YOUR system or OURS
- We'll configure a total system or part of one to your specifications

COMPUTER CAPITAL CORPORATION
274 RIVERSIDE AVE. WESTPORT CT 06880
203-226-8301

FOR SALE OPTICAL CHARACTER READER

TYPE:
Recognition Equipment, Inc.
MODEL:
I-80 Model A
CONTAINS
24K, 30 Type Fonts, 240 Masks, OCR-A, 600 LPM Printer, Two Potter Tape Drives 800/1600 BPI, IBM Selectric Console
CONTACT:
Mr. Carroll Hibert
State of Ohio
Department of
Administrative Services
30 E. Broad St.
SOT — 30th Floor
Columbus, Ohio 43215
Phone: (614) 466-6626

3042 APU SYSTEM
WALK-AWAY LEASES

2 Year — $66,050
3 Year — $47,310
4 Year — $37,600

NO SIDE LETTERS — NO GIMMICKS
NO RISK

FIRM DEALS — FIRM EQUITY

Contact: Jack Northrop
Lease Financing Corporation
3 Radnor Corporate Center
100 Matsonford Road
Radnor, Pa. 19087
215/527-4460

LFC

RCA Service Company Teleprinter Equipment Sale. Available from Inventory. Reconditioned.

	*Price
33ASR FF	$ 460
SF	560
35ASR	700
28ASR	700
Terminet 30 KSR W/300 Baud Modem Aneb.	1,995
Single MTA-Block Search	615
Dual MTA-Block Search	915
33ASR TWX FF or SF	1,460

*FOB RCA Shipping Point plus tax.

Modems, selectors and various accessories available on request

RCA

Send Order Requests to:
RCA Service Company
Attn: Lew Arnold
Bldg. 204-2
Rt. 538
Cherry Hill, N.J. 08358

FOR SALE OR LEASE

136 H 4655, 4670, 4672, 6981, 7861, 7862, 3215, 3046
145 HO 4768K AMS, 3 ch., 3274, 6810, 7855, 3215
145 I2 4660, 2152, 6111, 6982, 6983, 6810, 2001, 3215
145 HG2 6982, 4660, 6810, 2152, 6111, 3047, 3215
155 JOO 1433, 3215, DAT
155 JI 1433, 3215, all IBM
2-3803-1 dual density (1792)
8-3420-3 dual density (3550)
3811/3211 Printer & Control with P11 trains available
168 Memory 3 Meg NATL SEMI

3033N8 — March 1980

Bob Stevenson
Chuck Stehlik
Steve Zalusky
(916) 486-7576

Tom Harris
Tommy Talbot
(416) 267-3060

Member of Computer Lessors Association and Computer Dealers Association

---

FOR SALE OR LEASE
Below IBM List
3287-02

INTERSTATE COMPUTER

CMC

AVAILABLE NOW
S/7
5010-5012
5022-5026
(2)5028-001's
$19,950
Marie Bednarz

CMC

MUST SACRIFICE

AT UNBEATABLE PRICES — Either Lease or Purchase

3 DATA VAULT SAFES (SCHWAB)-Double Door 4 Hour Mag Tapes or Disk Packs in like new condition

RAISED COMPUTER FLOORING W/ STANCHIONS etc

IBM Type 129 CARD DATA RECORDER Model 3 IBM Type 557 Interpreter 519 Document Originating Punch 514 Reproducing Punch, IBM 029-C22 w/Interpreter and 522 w-Left Zero also IBM 026 Printing Keypunch, IBM 059 Card Verifier, IBM 083 and 082 Card Sorters

DEC Card Reader CMS 11-KA

IBM 360-30 65K-CPU-2 Channel w/ Additional Memory

Decitalker and 400 used Mag Tapes 1600 BPI with Seals & Canisters

IBM WORD PROCESSING SYSTEMS Model II & IV

Phone Toll Free: 1-800-521-0867 or in Michigan: Collect (313) 886-7000.

ALL DATA MEDIA CO.,
1200 East Bethesda Road
Detroit, MI 48203

WE
BUY • SELL • LEASE
S/3
MODEL 15/12/10

CSC Board Systems Corporation

2146 Livernois
Troy, Michigan 48084
Phone: (313) 689-6300
Jerry Roberts
Carole Solano

3203-4
3203-5
NOW!!!

Call Alan Kreiger
202-737-1401
Computer Resale Exchange

FOR SALE
DEC
VAX 11/780
SYSTEM
713-688-9405

BUY SELL LEASE

370 PERIPHERALS	370 CPU's
Disk Printers	135/145/155
Tape I/O	135/145/155

DOS	DATA ENTRY	UNIT RECORD
Sys. 32/34/36	3701/5496	029/129
All Sys. 3	All 3600	083/087

DATA AUTOMATION CO INC.
4858 [illegible] Road
[illegible] Texas 75[illegible]
214 637-6570

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

O.P.M. LEASING SERVICES, INC.

The Custom Leasing People

Branch Offices

ATLANTA	(404) 953-0926
BOSTON	(617) 933-9451
CHICAGO	(312) 945-8150
DENVER	(303) 493-4488
DETROIT	(313) 968-5811
HOUSTON	(713) 367-1666
LOS ANGELES	(213) 278-4117
MINNEAPOLIS	(612) 884-9980
NEW JERSEY	(201) 635-1092
N.Y. FINANCIAL DISTRICT	(212) 747-0220
ST. LOUIS	(314) 434-6330
SAN FRANCISCO	(415) 383-4111
WASHINGTON, D.C.	(202) 656-8676

International Offices

LONDON	01-222-4031
PARIS	1-549-1815
COLOGNE, GERMANY	221-763-1458

OPM

Corporate Headquarters
O.P.M. LEASING SERVICES, INC.
71 BROADWAY, NEW YORK, N.Y. 10006
(212) 747-0220 (800) 221-2674

Short and Long Term Lease Plans Available

CPUs

- 370/135, 370/145, 370/155, 370/165 — All Configurations Available For Sale or Lease
- 303X Series — Purchase/Leaseback of Installed or OPM Supplied
- 370/158, 370/168 — All Configurations Available For Sale or Lease
- 4300 Series — All Configurations Available for Sale or Lease (subject to adherence to IBM's order certification program)
- 370/138, 370/148 — All Configurations Available For Sale or Lease
- Amdahl All Models, CDC Cyber 74, Univac 1100 Series — All Configurations Available For Sale or Lease

FEATURES/MEMORY

- 370/158 & 168 ISC/Madrids All Channels — For Sale or Lease
- IBM Memory: 370/158s, 168s, etc. or 3000 Series Machines — For Sale or Lease
- OEM Memory: 155s, 158s, 168s, either EM&M, NSC, Intel or STC — For Sale or Lease

PERIPHERALS

- 3333/3330s, 3350s, 3830s — All Configurations Available For Sale or Lease
- 3803 Controllers, 3420 Tapes — All Models and Configurations Available For Sale or Lease
- 3211/3811, 1403/2821 — All Configurations Available For Sale or Lease

Complete Installation and Planning Support Provided

FOR SALE!

(2) New Systems:

VAX

★ ALSO AVAILABLE ★

11/70

11/34 · RP06 · RM03 · TE16

CALL 617-261-1100

AMERICAN USED COMPUTER

P.O. BOX 48, KENMORE STATION, BOSTON, MASS. 02215

4341

Available:
April 1980
November 1980

4331

Available:
Every month of 1980

Three and five year operating leases; also leases with purchase option.

(914) 238-9831

Computer Merchants Inc
Pt. South County Avenue, Chappaqua, New York 10514
Member Computer Dealers Association

Want To Buy

IBM System/34
Model E35 CPU
With Attachment For
650 LPM Printer
Delivery late March

Tom Potter
DELTA MARKETING SYSTEMS
913-677-1444

DEC IN STOCK SPECIALS

		DEC List	Our Price
11/03-LK	32KW MOS CPU	$4400	3980
11/34A-DE	16KW MOS CPU	13200	12500
H9602	Corporate Cabinet	2575	1895
LA36-CE	DECwriter II	2500	1795
RK11J-AA	2.5Mb Drive/Control	16700	5950

THIS EQUIPMENT IS FULLY WARRANTEED AND ELIGIBLE FOR DEC MAINTENANCE

call

BROOKVALE ASSOCIATES

516-987-7777 • 800-645-1167

Contact: Bernie Gest
(215) 765-1010
7704 Sandsate Ave.
Malvern Park, Pa. 19126

Computer Marketing Inc.

SALE/LEASE
IBM Peripherals

TAPES:	3420 Models 3,5,7,4,6,8
PRINTERS:	3203, 3211, 1403, 3287
DISK DRIVES:	3330, 3340, 3344, 3350
CONTROLLERS:	3803, 3811, 3830, 2821
CARD I/O:	3505, 3525 & 2540
CRT'S:	3278, 3277, 3274, 3276
DISC:	1419 Single & Dual Address, 1412 Off Line

IMMEDIATE DELIVERY!

buy-sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

MEMORY EXPERTS

[illegible]

Want to buy
Hazeltine
2000C
terminals
Contact Ray Helmke,
Cornell University
(607-256-4882)

3880's
Available Immediately

C.P.U.'s 3135, 3138, 3145
3148, 3158, 3168
3031, 3032, 3033

DISK: 333X, 334X, 3350, 3830
TAPE: 3410, 3411, 3420, 3803
PRINTER: 3203-2, 4, 5, 3211/3811
CARD 1/0: 2501, 3505/3525
CRT: 3277-1, 3277-2

Contact Mark Collard or Randy Pratt
Pioneer Computer Marketing
1165 Empire Central Place
Dallas, Texas 75247
214/630-6700

DEC NOW

[illegible]

WANTED FOR CASH

any and all DEC systems and peripherals all inquiries immediately answered

DATAWARE
[illegible]

PDP-11
DISK
DRIVES
300 MEGABYTES
AVAILABLE
IMMEDIATELY
NORDATA
[illegible]

Buy
Sell
Lease

• 3741 • 3742 •
• 129's •
•System/34•System/38•System/32•System/3•

PEARL
EQUIPMENT
COMPANY, INC.
P.O. BOX 24026 • 4717 CENTENNIAL BLVD
NASHVILLE, TN 37202 • (615) 383-6703

Pearl EQUIPMENT CO. INC.

3272 3741
3277 3742
3286 129'S
SYSTEM 34
BUY — SELL — LEASE
JIM CARLETON

370/138
370/148
BUY — SELL — LEASE
JOHN MILLS

National Computer
Equipment Corp.
[illegible]
St. Clair Shores, [illegible]
[illegible]

IDS international data services, inc.

DEC
SYSTEMS
PDP 11/70's,
11/34's, 11/04's,
11/03's & Peripherals
BUY & SELL

(415) 969-7222
telex 345 592
453-D Ravendale Drive
Mountain View Ca. 94043

303X
SHORT TERM
LEASES
3 or 4 YEARS

NO SIDE LETTERS
NO GIMMICKS
NO RISK

FIRM DEALS — FIRM EQUITY

Contact:
Jack Northrop

LFC LEASE FINANCING CORPORATION
3 Radnor Corporate Center
100 Matsonford Road
Radnor, Pa. 19087
215/527-4450

AVAILABLE FEBRUARY
4331
SYSTEM

Corporate Computers, Inc
115 Mason Street
Greenwich, Conn. 06830
(203) 661-1900
Member Computer Dealers Association

FOR SALE/SWAP BY OWNER
HONEYWELL H-2641A-65
with 4-2048-8, 214-2,
122-3, 278-15
48K Datanet and 4 CRT's
Available approximately
April 1, 1980
Available March, 1980
2-K700 Basic Keytapes
6-K702/710 Keytapes with comm.
CONTACT: STEVE [illegible]
Quillico Plastic
1221 Brown St.
Birmingham, MI 48012
(313) 645-5100 Ext. 400

WANTED A.S.A.P.
IBM SYSTEM/7's

IBM maintained
5010-A4 · PROCESSOR MODULE
5028-C3 · ENCLOSURE
5028-01 · OPERATOR STATION (OPTIONAL)
larger models acceptable

Write,
THE BANK OF MONTREAL
740 Notre Dame st.west
10th floor
Montreal Canada
H3C 3X6
Attn: Ron Cooper

FOR SALE
DISK DRIVES
IBM 2314-1 & A1
IBM 2314/2844
CALCOMP CD14/CD12
Equipped with 2 channel switch manufacturer maintained.
Contact:
Allen R. Cooper
Continental Air Lines
7300 World Way West
Los Angeles, CA 90009
(213) 646-3261

For Sale Or Lease
By Owner
IBM SYSTEM 3/10 32K
with (2) 5444, 5424, 3742 and direct attached 3741
Available April/May 1980
Bids Requested
Contact:
Frank Stephenson or Max Karagergian
Western Central Furniture
1725 Montgomery Street
San Francisco, California 94111
(415) 788-1788

FOR SALE
NCR Century 151
192 K Multi-Programming
6- 657 Dual Density Disc
2- 633 Tape Drives
1- 646 Printer (1200 LPM)
1- 6420 Printer (600 LPM)
1- 667 Card Punch
Currently under
NCR Maintenance
Contact: Wayne Mullenaugh
513-241-3480

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

dataserv COMPUTER MARKET PLACE

We're changing the way companies buy, sell and lease IBM computers

dataserv specializes in IBM equipment and satisfied customers

Dataserv has successfully completed over 5000 IBM computer transactions. We have the experience you need and a reputation you can depend on. That's why we're one of the world's largest companies specializing in pre-owned IBM products.

CPU'S	GSD	DISK	PRINTERS
370	32	3330	1403
360	34	3340	3203/3211
	38	3344	DATA ENTRY
	Sys/3	3350	3277
	TAPE	MICR	3741
	3410	1419	I/O
	3420	1255	3505/3525
			ATM's

Member Computer Dealers Association

dataserv headquarters
800 328-2406

WANTED

New PDP 11/70 Systems with 1024KB, 1 x RM03, 2 x RM05, 1 x TM16, 1 x TE16, 1 x LA36. Prefer 220VAC 50HZ
SOFTWARE RSX - 11M
IMMEDIATE DELIVERY

CONTACT:
Benny Wong
1239 Kearny St.
San Francisco, CA 94133
(415) 391-6621

BUY SELL LEASE

IBM 5265-5266 CASH REGISTER TERMINALS

(3) 3742 Avail. 3/1

David Greenberg
(714) 641-6366

Marshall Lewis & Assoc.

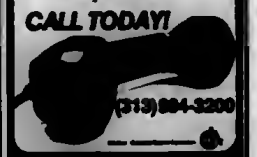
IMMEDIATELY DELIVERY ANY QUANTITY

DEC and DATA GENERAL

computer equipment

CASH AVAILABLE

CALL TODAY!



(313) 994-3200

BUY SELL LEASE

SYSTEMS 3/10 & 15-32-34-38
Series 1 — 51XX

Available:
S/34-E35-E34-C23-C24-D35
5251-11, 5251-12, 5256-03

Communication:
3271, 3272, 3277, 3284
3284, 3286, 3288, 3776
3777, 3780, 3704, 3705

Peripherals:
3741, 3742, 129, 029, 059
3715, 3717, 083, 514, 548
3410, 3411, 3340, 3344

GEMINI COMPUTER CORPORATION
8383 N. Stemmons Frwy., Suite 303
Dallas, TX 75247 AC214/631-3116

IBM FOR SALE BY OWNER

2 - Hi Speed IO sets
2 - 3040 CPU's Mod. G
10- 2401 Model 3 tape drives
2 - 2804 Tape Controllers
1 - 2314 DASD 1x9
Under IBM Maintenance

CONTACT
R.J. DITCH
(318) 233-6541

HEWLETT PACKARD
For Sale
HP 3000 SERIES III

2 MB Memory, 1-7920
3-7925, 1-7970E
1-2640B, 3-2645
1-2631, 16-2608
1-6671, 1-2608

Available July, 1980

WESTERN DATA SYSTEMS
P.O. Box 7000
REDONDO BEACH, CA 90278

FOR SALE/ LEASE

MACHINE	AVAIL
4331-J	3/80
3880-1	4/80

Capital Funding Corporation
(201) 461-3158
Bob McNamara

4300, 4291, 4299 Data Acquisition
4234 Disk Controller
4241 ULM 5
0636 Map for Nova III
2 High Speed Paper Tape Readers
Core for Nova 1200
Eclipse 16 KW Core
SLA 4874
Nova 2 CPU & Memory
Nova 1200, 840 & Nova 2's
Line Tape
Tektronic Hard Copy Printer
Graphics CRT Computcom 400
2216 Mighty Mux 4 or 8 Line
Disk Packs.
DG 6012 & Infotan CRT
4000 4 Line Mux

RP04AA RH11 RH70
TU 10
M 7800
DLV 11E
RK05 J RK05 F RK 110 RK8E
MJ 11 DE
RP02
RP802
RP03
DS 310
ADOS 929
TU 45
TU58/TC11
11/03, 11/34, 11/40
11V45, 11/60 Systems
EDS Point 4 20% Discount
Entron Systems.

USED!!! IBM 4331-J

Call Alan Krutger
202-737-1401
Computer Resource Exchange

★ 32 ★
IBM GUARANTEED
$10,800
617-391-1100
AMERICAN COMPUTER GROUP

FOR SALE OR LEASE
IBM 3155 with DAT
AND 2 MEG of AMS PS
AVAILABLE NOW

FOR LEASE
IBM 3033-N8
NEWPORT
MARCH 1

IBM 3880's
JANUARY FEBRUARY

516-752-1000 312-692-5900

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

NEW
IBM SYSTEM/34
E35
AVAILABLE 7/80
USED
SYSTEM/34s
SYSTEM/32s
SYSTEM/3
MOD 12
Tom Potter
Delta Marketing Systems
913-677-1444

11/70
1024 KB MEMORY
600 MB
125 INCH-PER-SECOND TAPE
16 ASYNCH COMM LINES
AVAILABLE IMMEDIATELY
NORDATA
(800) 323-1170

LARGE QUANTITY AVAILABLE
PDT 11/150
Immediate Delivery ★ Purchase or Lease
Call Howard Johnson at (617) 261-1100
AMERICAN COMPUTER GROUP

IBM 4331
Available For Lease
March 1980 Delivery
Contact
W.P. Davis
Network Computing Corporation
Charlotte, NC 28210
Ph. (704) 525-5610

FOR SALE
B-6700
System
available now
call
Robert D. Thompson
(301) 344-4421

COMPUCOM

DEC PDP11
EQUIPMENT AVAILABLE

PROCESSORS:	11/05	8K	$ 3,000
	11/35SC	32K	7,000
SYSTEMS:	DS540CA, 96K, 16 lines, Dual RK05, RSX11M		35,000
	11/40, 128K, VT50, DH11, RK11CA, RK11J, RK05J		
DISK CONTROLS:	RH70		10,000
	RH11		5,000
	RK11-D		2,000
DISK:	RK11J		7,500
	RK05		2,500
	RP04		20,000
	RP03		7,000
	RP02		2,500
	RF/RS11		5,500
TAPE:	TU10 (Slave)		6,000
	TU10 (Master)		7,500
	TMA11		5,500
	TU45		12,000
	TU16		14,500
	TU55		1,000
	TU56		2,500
MEMORY:	MM11		2,000
	MF11VP		3,000
	MM11DP		2,000
PRINTERS:	LA180		2,500
	LP11VA		5,500
TERMINALS:	VT50		1,000
	VT52		1,500
	LA36CE		1,200
COMMUNICATIONS:	DH11AD		6,500
	DH11AE		6,500
	DQ11DA		1,000
CABINETS/ EXPANSION BOX	H960		1,000
	BA11KE		2,500
	H9086A		1,500
MISCELLANEOUS:	DA11F Bus Window		2,500
	BMB73-YB		500
CARD EQUIPMENT:	CR11		3,000

COMPUCOM INC.
3402 OAKCLIFF RD., B-7 ATLANTA, GEORGIA 30340
(404) 452-1090

BUY • SELL • LEASE

370/115
370/125
Call Ken Bouldin or John Ferguson

370/135
370/138
Call Mike Nelson

370/145
370/148
Call Verlyn Sims

S/3
MODEL 8
MODEL 10
MODEL 12
Call Roger Odom
MODEL 15
Call Jack Goodman

S/32 3741 3742
Call Gayle Drotar

S/34
Call Roger Odom
IBM Maintenance Guaranteed

TAPE
3411 • 3410
3420
DISK
3340 • 3344
3350
Call Bob Ford

ECONOCOM
1755 Lynnfield Road
P.O. Box 17825
Memphis, Tennessee 38117
901-767-6130
Member CDA

CLASSIFIED ADVERTISING ORDER FORM
Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Turnkey Systems and Real Estate.)

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are $73.50 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $147.00 per insertion. Extra space is available in half-inch increments and costs $36.75. Box numbers are $10.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us), WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired: _____ columns wide by _____ inches deep.

Issue Date(s): _____

Section: _____

Signature: _____

Name: _____

Company: _____ Title: _____

Address: _____

_____

Telephone: _____

Send this form to:
CLASSIFIED ADVERTISING, COMPUTERWORLD
375 Cochituate Road, Route 30, Framingham, MA 01701

BUY · SELL · LEASE
ALL CPU's & PERIPHERALS
360 303X
370 4300 Series
Contact Computer Leasing Inc
(201) 569-7617

IBM SYSTEM 38
Delivery position of October 17, 1980
You may configure to suit your needs
Contact:
Linda Centre
Dauphin Distribution Service Co.
Mechanicsburg, Penn. 17055
717/795-3666

DATAPOINT 1800
Immediately available
60K user
Dual floppy - 1 meg
$10,500 or best offer
Datematics
Englewood Cliffs, N.J.
(201) 947-6100
We can also provide software
We have over 80 packages

SYSTEM 34
E 35
WITH 650 LPM PRINTERS
Available 2/6/80
2/29/80
Swan Computer Group
7300 West College Drive
Palos Heights, IL 60463
(312) 448-4300

** OVERSTOCKED **
T.I. Terminals

Model 745	$1425.00
Model 745 U/L	$1525.00
Model 743	$1025.00

1% 10, Net 30 Days
B On-Line Systems, Inc.
(312) 627-4044

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

THIS SPACE FOR HIRE.

[Inquire at Classified Advertising Dept.]

DEC PDP-11 Equipment FOR SALE

PDP-11/70-VA
PDP-11/45-BK
PDP-11/20A-DE
MM11-DP
RK05
RP-RS0
LP11-VA
CTB11-KM
CR 11
DZ11
DL11-E
DU11-DA
KB11-A
LA30
VT52
640W core
RX11-E, KT11-D
LAIN, RETS-7.3
DL11-W, KT11-B
11/34 CORE
DECO
DECO
PRINTER
CARD RDR/PUN
CARD RDR
8 USER MUX
ASYNC INTERFACE
SYNC INTERFACE
ARITH OPTION
DECWRITER II
SCOPE

GAIL R. DOBBINS AND ASSOCIATES, INC.
SPECIALISTS IN DIGITAL EQUIPMENT
408-737-0600

The Best Option

S/32

S/34

S/3

S/38

BUY-SELL-LEASE

COT
COMPUTER OPTIONS INC.
2600 Metro Drive
Minneapolis, Mn.
55420
612-854-5870
800-328-1981

In Canada... let us quote a custom-configured IBM computer system in new condition, with quick delivery, at big savings under IBM factory prices.

Don Dupuis
Windsor, Ont.
(519) 256-8010

John Bastien
Montreal, Que.
(514) 286-8455

CMI — Remember the name

CMI COMPANY

SHORT TERM LEASES

135's, /145's, /155's, /145's
3330's, 3350's, 3420's
360/40's, /50's, /65's

Call Us Collect

UNITED STATES	
Boston: Eastern Regional Headquarters	(617) 272-8118
Arlington	(703) 521-0300
New York	(212) 832-2622
Philadelphia	(215) 293-0546
Austin: Southern Regional Headquarters	(512) 451-0121
Atlanta	(404) 768-6535
Dallas	(214) 233-1616
Houston	(713) 447-0325
Chicago: Central Regional Headquarters	(312) 298-3010
Pittsburgh	(412) 922-8920
Detroit	(313) 961-1675
Minneapolis	(612) 370-1153
St. Louis	(314) 353-6265
San Francisco:	
Western Regional Headquarters	(415) 283-9000
Los Angeles	(213) 670-7994
CANADA	
Toronto	(416) 366-1518

BROKER/DEALER SALES AND LEASING

Chicago	(John O'Shea)	(312) 298-3010
Dallas	(Bill Tucker)	(214) 233-1616
New York	(Richard Ventola)	(212) 832-2622
San Francisco	(Henry Paulson)	(415) 283-9000

GREYHOUND COMPUTER CORPORATION
800-528-6113

Need repair or refurb services?

800 423 5321
In California
213-600-6031
Ext. 14 or 16

- Tape Drive and Disk Heads
- Capstan and Reel Motors
- Power Supplies
- Rotating Memories
- Core and Mass Memory
- Electro-Mechanical Assemblies
- Spare Parts and Equipment

TYMSHARE®
Equipment Support Division

BURROUGHS 4700 EQUIPMENT FOR SALE

B4700
Console Printer
Card Reader
1800 LPM Printer
3 Magtape drives
Head per track disk

FOR FULL DETAILS CONTACT:

Hospital Computing Services of Ontario, Inc.
1325-123 Edward Street
Toronto, Ontario
M5G 1G5
CANADA
Attention: Mr. John R. Young
(416) 966-1900

SALE or LEASE Immed. Avail.

2803-2
CONTROLLER
HI-SPEED
I/O SET-UP
W/DCS
$675 per mo.
(based on 36 mo. lease)

FOR LEASE
4341 PROCESSOR &
CONSOLE 8/80 DELIVERY

Call George Gilman
Toll FREE Outside N.Y.
800-221-8438

DTC TERMINALS NOW IN STOCK

LA34 DECwriter IV	$1,225.
LA36 DECwriter II	1,675.
LA120 DECwriter III	2,250.
LA180PA DECprinter I	1,900.
VT100 DECscope CRT	1,900.
VT132 DECscope CRT	2,275.

IN STOCK — THE NEW DATAMEDIA DT80/1. All the features of the DEC VT100 plus ADVANCED VIDEO and PRINTER PORT at no additional charge ..... $1,950.

DATA PRODUCTS 2230. Equivalent to DEC LP11VA including parallel interface ..... $8,995.

Call Toll Free
(800) 854-0350
2770 East Regal Park · Anaheim, CA 92806
In Calif. (714) 632-6986

DTC IS A DATALEASE COMPANY

4331-I

AVAILABLE FOR LEASE
OCTOBER 1980

5 or 7 year terms
ITC to Lessor or Lessee

Contact
Mike Keller
DIAL LEASING CORPORATION
Des Moines, Iowa
(515) 243-2131

OVERSTOCKED

Brand New • Sale or Lease
XEROX 1740, 1750, 1760
Vector Microcomputers
MZ, MT, System B

IMMEDIATE DELIVERY · BEST PRICES · VOLUME DISCOUNTS

ISLAND computers
1111 Victory Blvd. S.I., N.Y. 10301
Tel. 212-981-5143

FOR SALE:

Burroughs B700 Computer, with 4.6 megabites of disk space on 2 spindles. Main processor has 48K internal memory, 160 line per minute printer. Equipped with printing console. 1. Forms Burster, 2. Forms Decollator. $12,500.00 cash, must sell due to business being sold. Contact: Carolyn Pryer, AC 205-263-6866, Montgomery, Alabama 36108.

WANT TO BUY IMMEDIATELY

11/70

NAMATA
(206) 282-1170

FOR LEASE
IBM
3031's
3032's
3033's

TexCom

A Computer Leasing Company specializing in IBM, Amdahl, Systems Products

© San Antonio, Texas

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

WANTED
USED
IBM
SYSTEM 34

617-261-1150
AMERICAN COMPUTER GROUP

ROCKWOOD COMPUTER CORPORATION
Full Service Computer Leasing Since 1963

33 West Tarrytown Road
Elmsford, New York 10523
Phone: (914) 592-3100
TWX: (710) 567-1247

Member Computer Dealers Association
A CLA Member

AVAILABLE

BUY & SELL
370 Peripherals
Will Buy IBM Rental Equipment
All Data Entry Equipment
System 3, 34 & 38

Vantage
Computer Marketing, Inc.
2400 Southwell
Dallas, Texas 75229
214/620-8380
TWX 910-860-5060

For Sale
Honeywell 62/40
128 KB Main Memory
2-29MB disk drives
80 col. cardreader
300 CPM
400 LPM printer
132 print pos.
120 CPS console
2-Synchronous CRT's

All Under Honeywell Maintenance

Contact:
A. J. Deaches
National Electric Coil
941 Chatham Lane
Columbus, Ohio 43221
614/459-1200

CMI
AMERICA'S LEADING SELLER & SERVING THE USER MARKET

ATTACHED PROCESSORS
3168 3033
Available Immediately
Sale or Lease

1 800 521 9648
CMI INFORMATION

ATTENTION
Data General & DEC
Buyers & Sellers

McIntyre's
Mini Computer Marketing

ATTENTION
System 34 Users
Features 4901
(16 Device Expansion)
In Stock Now!

Call
213/956-4982
Cass Marketing
Services, Inc.

BUY-SELL-SWAP
PDP 11'S & NOVA'S
Systems and Peripherals at very attractive prices New and Used

WEST COAST COMPUTER EXCHANGE INC.

408-732-4523 408-732-4524

IBM Unit Record Equipment

Mach	Sale	Lease	Specials		Mach	Sale	Lease
026	$ 750	$30/mo	087	$2100.	085	$1200	$40/mo
029	$1750	$50/mo	3948(35)	$ 550.	088	$2750.	$125/mo
082	$ 750	$30/mo	3948(70F)	$ 800.	129	$3200	$110/mo
083	$1700	$40/mo	3741	$3000.	548	$1300	$40/mo
084	$2750.	$125/mo	3742	$4000.	557	$3500.	$125/mo

Other Machines Also Available

Disk Packs, Cartridges, Modules

3336-11	$299.00	2316's	$99.00	DATA MOD's	$949.00
3336-1	$149.00	1316's	$30.00	CARTRIDGES	$39.00

We Purchase Used Packs & Modules

New Memorex Mag Tape from $10.49 ea.
100% Recert. Mag Tape from $7.49 ea.
Memorex Diskettes & Non IBM Packs in stock.

Thomas Computer Corporation
600 North McClurg Court Chicago, IL 60611 (312) 944-1401

Systems
3/32/34/38
CALL FOR A QUOTE
(612) 333-6476

NORTHERN GROUP INC.
2124 [illegible]

34 and 38 delivery positions available.

For Sale or Lease
4331 S/3
IMMEDIATE DELIVERY!
S/34 S/38
Sun Data, Inc.
Call 1-800-241-8862
(404) 448-6116

BUY SELL LEASE
or
TRADE
DEC Computer Systems and Peripherals

SOUTHWEST AUTOMATION CORP.
14700 Memorial Drive,
Suite 104
Houston, Texas 77079
713-496-4301

Computer Service Cost
(216) 759-1010
7204 Sunbeam Ave.
Maple Park, Pa. 19135

IMMEDIATE DELIVERY
3344 DISK UNITS
3420 TAPE DRIVES
3203-5 PRINTERS
3274 / 3276 / 3278's

WANTED
3350 DISK UNITS

For Sale
NCR 615-101 Century 32K
(2) 667-102 30 mb disks
648-132 300 lpm Printer
604-110 Tape Controller
Card Reader & I/O Reader
(2) 633-110 Tape Drives
Disk Controller 629-301

Burroughs T-88 High Speed MICR
Burroughs T-800 MICR Machines

Call: Walter Bradford
The Statement Service
1242 W. First St. - Los Angeles, CA 90026
213-486-5761

INFLATION FIGHTERS

DEC RL01 Add on Disk Drives	$3,700.00
D.G. Eclipse® S200 With 48KW Core MMPU, Floating Point	$8,000.00
Nova® 1200 With 32KW Core, APL, PF	$4,300.00
Eclipse S140 8KW Core	$ 850.00
Nova 4C With 64KB Memory	$2,800.00

* Wanted to Buy *
Nova 2's PDP 11/04's and 11/34's

Many Other DG & DEC Systems and Peripherals Available
CALL TODAY (408) 733-4400
minicomputer exchange inc.

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

EQUIPMENT AVAILABLE

370/158

158-U34 (ISC and Madrids)	lease only	4/15/80
158 Memory - 2 megs (NSI)	sale or lease	now
M upgrade and 3058 for 158	sale or lease	now

370/168

168 Memory - 4 megs (IBM) (includes 5th meg)	lease only	now
2860-1	lease only	now
2860-2	lease only	now
2880-1	lease only	now

3033

3033-N4	lease only	7/18/80
3033-N8	lease only	3/21/80 and 7/18/80

CONTACT:

LFC

Jack A. Northrop
Lease Financing Corp.
3 Radnor Corporate Center
100 Matsonford Road
Radnor, PA. 19087
215/527-4400

Available immediately, new and unwarranted:

CENTRONICS PRINTERS FOR SALE

Model 702 - 9 x 9, 12 CPI, upper & lower case, 128 char. set, par. interface . . . . . $1995. CDN (app.) 1695. US

(OEM price only)

S.B.I. SYSTEMS LTD.
300 Ste. Croix Blvd.
St. Laurent, Que.
H4N 2V9
Tel: (514) 748-6666

For Sale or Lease

3033-N4, N8, 3036
4331, 4341
3333-I & II, 3330-I
3303-5, 3211/3811

Wanted
3420-6 DD
3310's
3340's
3350's

BARRETT CAPITAL & LEASING CORPORATION

707 Westchester Avenue
White Plains, N.Y. 10604
(914) 683-1960

IPS

Sale or Lease	Sell/Lease
3168's Available 30-45 Days	3031-3 Used Available Now
Quick Delivery: 3158 U34, 3148 K, 3138 J — Sale or Lease Available Now	We're Buying: 3168 Memory, 3158 Memory, 3148 Memory, 3138 Memory — Any Delivery
Sell/Lease: 3145 CPU, 3135 GF — Available Now	We're Buying: 3350-A2/A2F, 3350-B2/B2F, 3350-C2F, 3340-A2/B2, 3344-B2 — Immediate Delivery

New Jersey [illegible] Chicago [illegible] Atlanta [illegible]

IPS

REPLACE YOUR IBM
3830's (1&2), 3330's & 3333's (1&11)
with
MEMOREX UNITS

3672 Storage Control Units
3673 Disc Controllers
3675 Disc Modules

AVAILABLE IMMEDIATELY: LEASE OR SALE
Contact: Harry Blair 713/524-8249

3880's

214 630-6700

STATE OF CONNECTICUT
REQUEST FOR INFORMATION
REFERENCE: RF0025

The State of Connecticut is interested in receiving information on a Software System to satisfy Federal A-21 requirements at the University of Connecticut by July 1 1980

Such system must already be in the production mode using the IBM Control Program OS/VS. It must further be capable of satisfying one of the following criteria

1) Adding a Personnel System Module
2) Adding a Payroll System Module
3) Being able to interface with or be a part of an existing Personnel System

CONTACT
Gordon L. Partridge, Director
State of Connecticut (DAS)
Office of Resources & Facilities
340 Capitol Ave., Tel Pr.
Hartford, CT 06115
(203) 566-3064

REFERENCE: RF0025

CLOSING DATE: Ten (10) days from date of this issue.

A classified section is known by the companies it keeps.

COMPUTERWORLD

AVAILABLE

4341
July '80

RANDOLPH

Computer Leasing Associates

WE DEAL IN
DEC PDP11
AND
HONEYWELL LEVEL 6
SYSTEMS AND COMPONENTS

ALPHABYTE, INC.
6080 Aragon Circle,
Suite 8
Buena Park, CA 90620
(714) 736-8722

Honeywell Level 6
MODEL 33

LIST PRICE $46,950
SALES PRICE $29,000

128K BYTES MEMORY
1 VIP7105 1 VIP7205
10 MEGABYTE DISK
1 300LPM PRINTER
1 MDC 1 MLCP
1 COMM-PAC 2 LINES
Contact Henry Meyer, Pres
American Computer Ctr., Inc.
Tel: (305) 592-7050

SHORT TERM AVAILABILITY

COMPULEASE

FOR LEASE
4341 2 MEG
Available in July, 1980
System Plant Order #4866
Contact: Bud McComb
Call Collect
(602) 264-5000
Systems Marketing, Inc.
200 East Thomas Road
Phoenix, Az 85012

WANTED
HOME for NEW
★ **34** ★

617-391-1100
AMERICAN COMPUTER GROUP

3704/3705

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

About the IBM Price Cut

Wanted to Purchase

3031-2
3032-6
3350's A² B² C²

FOR LEASE

3033N-8 48 Months 6/80
158U34 month to month 6/80
AMDAHL V6-11 36 Month 4/80
370/155-DAT 3 meg any term

4 YEAR LEASE PLAN ON ALL 303X COMPUTERS

Call
GEORGE PRUSSIN OR CHARLIE ALBRIGHT
212-482-8640

SHA-LI LEASING ASSOC. INC.
40 Wall St., Ste. 4206
NY 10005

Inflation Fighters

Quality & Savings

Highly used, Heavy Duty Operation, Full Rack, All Sealed Units Sealed Sealed for use at 800 BPI through 6250 BPI.

3400' Reel $4.90 ea.
1200' Reel $4.60 ea.
600' Reel $3.25 ea.

All Tapes with Hanging Seals We pay freight on orders over 200 tapes. All orders shipped within 48 hours. Call or Write

Computer Tape Mart
100 S New Highway
Amityville, New York 11701
(516) 842-8512

BROKER IN DEC COMPUTER SYSTEMS AND COMPONENTS

C.D. SMITH
730 N. Post Oak Road
301
Houston, Texas 77024
(713) 686-8465

We Buy

370/158's & 168's
Purchase Option
Machines Qualify

For Sale

138, 148, 158 & 168 Memory

Contact:
Lacy Goostree
Tom Farley Tom Norris

transdata corporation
P.O. Box 6702
Dallas, Texas 75207
TWX 910-861-4134
(214) 631-5647

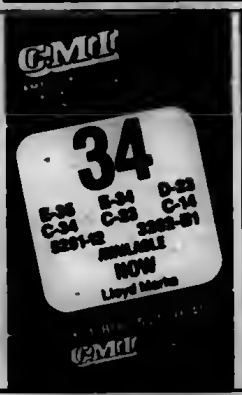
PRINTERS

Qume & Diablo

Excess inventory of new printer mechanisms in original cartons. All devices are bi-directional, plastic printwheel, letter-quality printers. No power supplies, covers or interfaces are included or offered.

Diablo HyType I Model 1300
Qume Sprint 1 Model 55000
Qume Sprint 3 Model 55000

3M Company, DCPD
3M Center, Bldg. 220-8E
St. Paul, MN 55101
(612) 736-8610



HEWLETT PACKARD PERIPHERAL

9 2645A CRT includes display enhancements-device supports r.o.m. and cable. Lists $3900. Your Cost $3250.

17 2631 Printers 180 CPS with pedestal and cable catcher Lists $3900. Your Cost $2950.

20 Vadic Modems VE3455P Lists $600. Your cost $645.

10 VA871 AM Telephone Lists $60. Your cost $60.

516-364-6130

STATE OF CONNECTICUT REQUEST FOR PROPOSAL

Vendors interested in receiving a copy of a forthcoming RFP for the sale by the State of Connecticut of

Hewlett Packard Disk System
[illegible] Processor (2100A)
Memory
Peripherals
Interfaces
Systems Equipment/Programming
Manuals

Contact:
Gordon L. Partridge, Director
State of Connecticut DAS
Office of Economics & Planning
[illegible] Capitol Ave., Tel Pl.
Hartford, CT 06115

Closing Date: Ten (10) days from date of this issue.

Reference: RP-[illegible]

(203) 566-[illegible]

DATA ACCESS ARRANGEMENTS/COUPLERS

CBT, CBT, CBS

MODEMS

103A, 212A, 202, 201C, 208A/B, 209
300-9600 Baud-Dial Up & Private Line
FCC REGISTERED
IMMEDIATE DELIVERY

FICOMP, INC.
109 Wilmer Road, Horsham, Pa. 19044
(215) 441-6600

CHARGE US!

(You can charge your subscription to Computerworld on American Express, Visa or Mastercharge)

COMPUTERWORLD

35% - 50% OFF LIST PRICE DATA GENERAL EQUIPMENT

Eclipse C-350*; Nova 3-D*
300 & 300 LPM Printers; TP-1 Terminals
Cabinets; CRT's; Disk Drives

(* Registered Trademark of Data General Corp.)

IMMEDIATE DELIVERY
Call 214/387-6602

HONEYWELL LEVEL 6 MODEL 36

For Sale
Call OR Write:
AMERICAN EXPORT GROUP
INTERNATIONAL INC.
600 NEW HAMPSHIRE AVE. NW.
WASHINGTON, D.C. 20037
ATTN: MR. JOY GHOSH
202-342-5700

NCR N8570 CRITERION

Super Buy
Call:
Gary E. Zywotko
(612) 884-6758

FOR SALE

Three (3) IBM 3830-2
Features: 2150, 2151, 6111, 6170
Full IBM Maintenance
Available March 24, 1980

Curtis Buckhorn
Pritchard, Inc.
Dallas, Texas
214/361-7600

Sale Purchase

DATA GENERAL

Computer Systems & Peripherals
For Sale

6067A 50MB Disk	$10,500	32KW Micro Nova	$1,950
6045 16MB Disk	$5,400	Micro Nova Dual Floppy	$1,950
6021 Single Floppy	$1,500	Micro Nova ASYNC. I/O	$150
4056 4 Line ALM-8	$750	DG Single Cabinet	$750
4057 8/4 ALM-16	$1,600	DG Double Cabinet	$1,350
2105A Data Media CRT	$600	32KW Nova 3/12	$5,500
C/150 System	CALL	Nova 4 System	CALL

AMES SCIENCES
301-387-3140

New PDP 11/03 LSI/11

- With 2 RL01 Drives
- VT52
- LA120
- Licensed for RT-11 & FORTRAN
- Substantial discount off list
- Available Immediately

Contact: Gene (212) 275-0700
GS Systems Inc.
370 Seventh Ave., Suite 717
New York, NY 10001

buy sell swap | buy sell swap | time & services | time & services | time & services

DEC EQUIPMENT

BUY - SELL - TRADE

- SYSTEMS
- PERIPHERALS
- SPARE PARTS
- NEW COMPATIBLE MODULES

Call toll free
800-423-8321 Ext. 14 or 15
In California
213-880-8881 Ext. 14 or 15

TYMSHARE
Equipment Support Division

FOR LEASE

ARRAYS
V6-II, 8 MEGS, 16 CHNLS
(April)

MSS
12 3420-8 W/6426
(March)
1 3803-2 W/6100
(March)

ACSI

FOR SALE

Fully Reconditioned

026-A22	$1750.
026-B22	$1950.
026-C22	$2750.
026-D22	$ 950.
026 Agcy.	$2000.
129-026	$3000.
As to UNIVAC 1710-04	$1200.

UPS
Since 1969
Call Tom McHugh
(617) 466-6000
60 Montvale Ave.
Stoneham, MA 02180

DEC PDP 11/15 16K

4 Floppy Disc Drives
Hazeltine 1500 CRT
Centronics Series 100
200 CPS - Dual Head Bi-Directional
Printer Teletype Machine

Best Offer
Mike Blaine
39 Central Avenue
Farmingdale, N.Y. 11735
(516) 293-3055

FOR SALE

BURROUGHS A8500 SERIES
REMOTE
AUDIT ENTRY SYSTEM
Style #501
Cassette to Disk

FOOD SERVICE
SYSTEMS, INC.
MARYLAND HTS.,
MISSOURI 63042
314/567-4000

For Sale

3340-B2	3747
3272-2	3742
2501-1	1403-2
2415-2	All 029's

3340-70 Data Mod.

Computer Products Company
529 W. 3rd St., Cinti., Ohio
513-721-3399

WANT TO BUY

3277 3742
S/3 3/4
MODEL 15/12/10
Sun Data, Inc.
Call 1-800-241-6662
(404)449-6116

TIME & SERVICES

IBM 4331

Available May
All Shifts
Wall Street Area
212/267-7008
P.O. Box 914
Wall St. Station
New York, N.Y. 10005

BROKERS OF COMPUTER TIME

N.Y. & Phila
Metro Areas Only
Computer Reserves, Inc.
(212) 599-0770
(201) 676-1001

DELAWARE VALLEY TIMESHARING

Eastern Pennsylvania
Philadelphia
South Jersey
DEC 11/70 RSTS/E
24 hours - 7 days
Most commercial packages
Custom work, flat rate
NATIONWIDE DATA DIALOG
70 James Way
Southampton, Pa. 18966
215-322-3000

CONSULTANT SERVICES NEEDED

The Mississippi Employment Security Commission will issue on February 25, 1980, a Request for Proposals (RFP) for consultant services to prepare system specifications that will lead to a total data processing systems upgrade. Prospective consultants should possess extensive knowledge of Employment Service and Unemployment Insurance applications. To receive a copy of the RFP, contact:
Earl M. Ingle
P.O. Box 1699
Jackson, Mississippi 39205
601-961-7404.

Boston area

Wanted: one shift on an IBM S/3 Mod 15.

DATASSURE
23 Mill Street
Manchester, Mass. 01944
(617) 526-4574

PDP 10/11

One call does it all
Maintenance
Systems Upgrade

- Servicing of Multi-vendor systems
- Installations, per-call, contracts.
- Memory, disc, tape & line printer upgrades

San Francisco
408/446-7220
Los Angeles
213/639-6574
Washington D.C.
703/841-1700

TYMSHARE
Equipment Support Div.
Computer Maintenance

MEMORY REPAIRS

ALL MANUFACTURERS
DEC, IBM, SS AND OTHER

- 10 Day Turnaround.
- 90 Day Warranty.
- Core or Semi Chip Repair.
- Reasonable Prices Since 1972.
- Low Flat Rate Available for Core, Large Mem and Repair Labs, OEM Bands.

WE HAVE A VAX® 11/780...

WITH TIME TO SPARE.

If you're losing productivity and money waiting for yours, or if you'd like to utilize its state-of-the-art capabilities without the trouble and expense of your own installation, we have the answer:

TIME-SHARING.
Our hardware is a VAX 11/780 VMS system with a PDP-11 RSX 11/M subsystem. Both remote and on-site time is available.

We can also offer the services of our highly trained professional staff to perform your conversion or development work now, before your equipment arrives.

GIVE YOURSELF A HEAD START.
For further information, call Fred Coher, Computer Center Manager, at (617) 862-6000.

LOGICON
16 Hartwell Avenue
Lexington, MA 02173
VAX, PDP and RSX are registered trademarks of Digital Equipment Corp.

SERVICE AGREEMENTS

MICRO COMPUTERS + MINI COMPUTERS

Indep an emerging leader in 3rd party maintenance companies is offering service agreements for Micros and Minis. Services can be performed on-site or at one of our four service centers located in Philadelphia, Dallas, Chicago or Toronto, Canada.

Indep also offers complete enhancement, reconfiguration, refurbishment installation, reinstallation, distribution or storage services. These services are available either on-site or in one of our facilities.

For additional information please contact
A. Lombard at 800-523-8662
or
(N in Pennsylvania)
215-322-3222

RSTS/E TIMESHARING

BASIC PLUS — FORTRAN
BASIC PLUS 2 — RSX11-E

Word Processing
Mailing Applications
Dual PDP 11/70 Systems with RP06 Disk Drives

Contact:
JMV Timesharing, Inc.
420 Lexington Avenue
New York, NY 10017
212-867-0870

370 168 mod 3 Datacenter

Specializing in
Remote Job Entry
TSO, CICS, and Batch
IBM 3800 Laser Printer
Very Attractive Rates
Contact: Stu Hartevsky
(212) 564-3030
Datamar
122 West 31 St.
New York, N.Y. 10001

DATA GEN. REPAIRS

800, 1200, NOVA 2 NOVA 3
Core Memory
Semi Memory
Add-to Memory
CPU Boards
10 Day Turnaround
90 Day Warranty

Three Delta Corp
1038 Kiel Court
Sunnyvale, Ca. 94086
(408) 734-6880

Computer Services

370/158-3
VS1 - CMS - DOS
REMOTE JOB ENTRY
INTERACTIVE COMPUTING
TURNKEY SYSTEMS
PACKAGED PROGRAMS
(201) 777-9484

One Passaic Street
Wood-Ridge, N.J. 07075

D.E.C. PDP 11/70 TIMESHARING

- RSX11M.Basic 11
- Basic Plus 2. PASCAL
- FORTRAN. Sort 2
- $4 to $6 per hour
- 24 hours. 7 days

American Data Processing
(404) 237-4797
Atlanta, GA 30027

SOFTWARE

DEC USERS, DEMS, AND SERVICE BUREAUS

COMPREHENSIVE SOFTWARE
INTEGRATED SYSTEM FOR DISTRIBUTORS

- Completely On-Line/Interactive Processing
- Order Entry
- Backorder Control
- Inventory Control
- Picking Tickets With Items in Warehouse Sequence
- Shipping Labels & C.O.D. Tags
- Invoicing
- Automated Accounts Receivable Application
- Price Lists With Multi-Level Pricing Options
- Marketing & Sales Analysis by Salesperson, Customer or Vendor
- Many Other Features
- CTSBM or RSTS/E DBMS

Full Software line includes Manufacturing & Accounting Systems. DEC Hardware & Software Assistance as needed.

Call: Software Department
J. BAKER
200 Hemmond Drive
Wheeling, Illinois 60090
(312) 459-3000
Twx: 910-651-0040
Offices in Chicago, Illinois and Los Angeles, California

"THE PHARMACY MANAGER"

Basic Four
Software Vendors.
Now Available

One of the most complete packages written for the Pharmacy

For more information call or write

Compucon, Inc.
P.O. Box 306
Silver Springs,
PA 17575
717/285-3440

HIGH-QUALITY ACCOUNTING AND FINANCIAL REPORTING SOFTWARE FOR DEC AND PRIME MINI-COMPUTERS.

- General ledger
- Payroll
- Professional time accounting
- Accounts payable
- Accounts receivable
- Data base management

COMPUTEKG
Programmed Business Systems
2020 North Lexington
St. Paul, Minnesota 55113
Toll Free 1-800-328-6514

software for sale | software for sale | software for sale | software for sale | software for sale

DEC USERS - SYSTEM PROGRAMMERS
PASCAL

is a viable alternative to:

- Fortran
- Assembler
- Basic Plus
- Basic Plus 2

CSCI distributes and supports OMSI PASCAL for the greater Boston and New England areas. OMSI PASCAL offers incomparable features for systems programming and general applications. Call us and explore a modern, productive software tool. Available for RSTS, RT11 and RSX.

COMPUTER SOFTWARE CONSULTANTS, INC.
200 Boylston St., Chestnut Hill, MA 02167
(617)-964-4316 Ask for Jeff

OMSI PASCAL is a registered trademark of Oregon Minicomputer Software, Inc. RSX, RT11 and RSTS are registered trademarks of Digital Equipment Corp.

DEC RSTS/E USERS

From one of the pioneers in commercial data processing using RSTS. ON the shelf software ready for immediate delivery. Completely interactive. Extensively documented. Fully supported. Ideal for OEM's, service bureaus or end users. Cost effective solutions including:

- ACCOUNTS PAYABLE
- GENERAL LEDGER
- FINANCIAL REPORTING
- ACCOUNTS RECEIVABLE
- PAYROLL

For complete details, contact us at:

Plycom services, Inc.
P.O. Box 160
Plymouth, IN 46563
(219) 936-6121

SYSTEM 34 Speed View Utility

- View reports from any workstation before printing
- Save reports on disk or delete
- Transmit reports to other systems

CFS Industries, Inc.
St. 1, Ashland, MO 65010
(314) 657-3683
Another CFS Production Product

When DP Professionals are hiring or looking they came to the same CONCLUSION:

The Placers Inc.
JOHN RANDOLPH
Specialists in YOUR Field
302-575-1414
PO Box 266 Wilmington, DE 19899

DEC RSTS/E APPLICATIONS

General Ledger
Accounts Payable
Accounts Receivable
Financial Planning
Reg Z Billing
Payroll
Inventory Control
Bill of Materials
Job Shop Control
Order Processing
MRP

★ Recipient of Gold Star ratings in the DEC AIP program, based on clients recommendations.

IMS COMPUTER SOLUTIONS TAILORED TO FIT YOUR BUSINESS NEEDS
INTERACTIVE MANAGEMENT SYSTEMS, INC.
375 Concord Avenue, Belmont, Massachusetts 02178
(617) 489-3550

[redacted]

[redacted]

For use on all PDP-11 Systems. Versions are now available for use with RT-11®, RSX®, and RSTS-E® Operating Systems.

All are designed to provide comprehensive management reports, multiple operated select and sort capability allows management to zero in on problem areas. Can be utilized by management in military, construction, or manufacturing environment. Complete hardware/software systems are available.

For complete information, call or write:

[redacted]

"PDP, RT11, RSX, and RSTS" are registered trademarks of Digital Equipment Corporation.

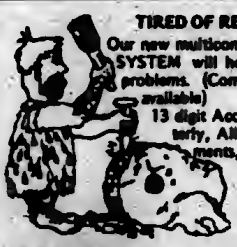
[redacted]

FINANCIAL MODELING DEC PDP-11 RSTS/E

- Budgets
- Cash Flow
- Planning
- Consolidation
- Forecasts
- Project Evaluation

FINAR SYSTEMS
(212) 222 2784 132 Nassau St., #212 New York, NY 10038
(415) 348 6610 San Francisco
(312) 686 3622 Chicago
(713) 626 9677 Houston

FINAR
The Financial Analysis and Reporting Language



TIRED OF REINVENTING THE WHEEL?
Our new multicompany FINANCIAL REPORTING SYSTEM will help end your general accounting problems. (Compatible A/P and other systems available)
13 digit Acct. #, Budgets, Comparative, Quarterly, Allocations, Consolidations, Departments, Billion $ amts., Recurring entries, Change in financial position.
BANCROFT COMPUTER SYSTEMS, INC.
P.O. Box 1533, W. Monroe, LA 71291
(318) 388-2236

C COMPILER FROM YOURDON

Source code in C and MACRO-11
so you can fit the compiler to your needs
Narrative program logic manual
so you know exactly how it works
Documented C test stream
so you can check out your modifications
C and RSX runtime libraries
so you can load and go in RSX
License: $2,500 Support: $500/year

SCOTT GUTHERY, (212) 730-5840
YOURDON SOFTWARE PRODUCTS GROUP
1133 Avenue of the Americas, New York, N.Y. 10036

RSX® is a registered trademark of Digital Equipment Corp.

RPG TO COBOL

Dataware's software translator converts RPG and RPG II programs to the industry standard ANS COBOL (DOS or OS). The translator achieves an extremely high percentage of automatic conversion (approaching 100%) of the source code

- RPG/RPG II to PL/1
- PL/1 to COBOL
- EASYCODER/TRAN to COBOL
- BAL/ALC to COBOL
- AUTOCODER (7070) to COBOL
- COBOL to COBOL
- AUTOCODER/SPS to COBOL

For more information on our translators, write or call today

Dataware, Inc.
2666 Elmwood Avenue
Buffalo, NY 14217
(716) 876-6722

BUSINESS APPLICATIONS

transcomm

TOLAS – II
DEC RSTS/E
ICP Million Dollar Award Winning Products, from the World's *First* Commercial RSTS Service Center.

DISTRIBUTION SYSTEMS
- Order Entry/Invoicing
- Inventory Management
- Sales Analysis
- Purchasing

FINANCIAL SYSTEMS
- Accounts Receivable
- Accounts Payable
- Financial Reporting + FINAR
- Payroll
- Fixed Assets

TRANSCOMM DATA SYSTEMS
412-683-6770 1380 Old Freeport Road Pittsburgh, PA 15238
415-439-7123 San Francisco, CA

[redacted] COMPUTER DISTRIBUTOR

NEW LIFE FOR 1401 PROGRAMS

CS-TRAN converts your 1401 object programs to COBOL for the mainframe or mini of your choice.

CS-TRAN is the only translator that accepts your object programs, patches and all, yet allows you to include actual COBOL paragraph names and record definitions.

If you'd like more details about new life for your 1401 programs just call or write Russ Sandberg.

CS
C-S Computer Systems Inc.
99 John Street, New York, NY 10038
212-349-3535

PDP-11 TRANSACTION PROCESSING

RM-11 is a complete on-line transaction processing system evolved by CYTROL. It extends RSX-11M to provide:

- Communications management for up to 300 2780 type terminals.
- Screen management and spooled output to remote printers.
- A data base management system specifically designed for on-line performance.
- An unrestricted RSX-11 environment.
- An overlap-seek disk driver for improved performance.
- Many other features commonly needed for transaction processing.

Applications can be written in any DEC supported language and have access to all RSX-11M services.

The Overlap Seek Disk Driver, Communications Management, and Data Base Management are also available as stand-alone products.

cytrol Incorporated
Box G
4570 West 77th Street
Edina, Minnesota 55435
(612) 835-6900

DEC RT-11/PDT WORD PROCESSING

TEACH your computer to do new tricks in its spare time for only $1250!

- Do you have documents that require constant revision and retyping?
- Do you produce a product that requires user guides and manuals?
- Do you advertise by Direct Mail with Form Letters—or should you?
- Do you need to manage mailing lists and automatically print labels?

CALL UAP at (714) 549-4832 for more information or send a $10 check for a copy of the user manual. Dealer Program available. Fully Guaranteed.

UNIQUE AUTOMATION PRODUCTS
17922 Sky Park Circle, Suite L
Irvine, CA 92714

DEC RT/11/P-11 SPECIALISTS

Datamate & Genius Database software for NCR 8100, 8200 & 8400 computers.
Dealer inquiry invited
Datamate Company
1418 S. Quincy
Tulsa OK 74120
918 584-4278

RSTS/E & RSX-11M SOFTWARE PACKAGES

KDSS a multi-terminal key-to-disk data entry system.

TAM a multi-terminal screen-handling facility for transaction-processing applications.

FSORT3 a very fast record sort for RSTS/E.

SELECT a convenient, very fast package for extracting records that meet user-specified selection criteria. (RSTS/E only.)

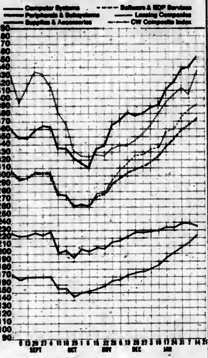
BSC/DV a device driver for the DEC DV11 synchronous multiplexer that handles most bisynchronous protocols. (RSTS/E only.)

COLINK a package that links two RSTS/E systems together using DMC11s.

DIALUP a package that uses an asynchronous terminal line to link a local RSTS/E system to a remote computer system. Supports file transfers, virtual terminals, and dial-out through a DN11.

Evans Griffiths & Hart, Inc.
55 Waltham Street
Lexington, Massachusetts 02173
(617) 861-0670

Computerworld Stock Trading Index



COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

CW COMMUNICATIONS/INC.

Board Chairman/Publisher
Patrick J. McGovern

President
W. Walter Boyd

VP-Research Jack Edmonston
VP-Marketing Roy Einreinhofer
VP-Editorial E. Drake Lundell, Jr.
VP-Finance William P. Murphy
VP-Circulation Margaret Phelan
VP-Production Lee Vidmer

Computerworld Headquarters
375 Cochituate Road
Framingham, Mass. 01701
Phone: (617) 879-0700
Telex: 95-1153

SALES
Vice President Roy Einreinhofer
Administrator Frank Collins
Display Adv Melinda Walker
Miriam Gaylin
Classified Adv Mgr William J. Mills

RESEARCH
Vice President Jack Edmonston
Market Research Kathryn Dinneen

CIRCULATION
Vice-President Margaret Phelan
Circulation Mgr Barbara Jeannetti
Service Rep Peggy Kelly
Assistant Carmela Priante

PRODUCTION
Vice-President Lee Vidmer
Production Mgr Peter Holm
Supervisor Henry Fling
Typesetting Mgr Tom Pfau

Computerworld Sales Offices

Roy Einreinhofer
Vice-President/Marketing
Frank Collins
Manager, Display Advertising
William J. Mills
Manager, Classified Advertising
COMPUTERWORLD
375 Cochituate Road
Framingham, Mass. 01701
Phone: (617) 879-0700
Telex: 95-1153

BOSTON
Robert L. Ziegel
Northern Regional Manager
Chris Lee
District Manager
Edward P. Marecki
District Manager
Kathy Doyle
Account Coordinator
Susan Wolfe
Account Coordinator
COMPUTERWORLD
375 Cochituate Road
Framingham, Mass. 01701
Phone: (617) 879-0700
Telex: 95-1153

NEW YORK
Donald E. Fagan
Eastern Regional Director
Mike Eisenkraft
District Manager
Peter Senft
District Manager
Candy Kelly
Account Coordinator
COMPUTERWORLD
2125 Center Avenue
Fort Lee, N.J. 07024
Phone: (201) 461-2575

CHICAGO
Thomas H. Knorr, Jr.
District Manager
Jane Wrightman
Account Coordinator
COMPUTERWORLD
230 North Michigan Avenue
Chicago, Ill. 60601
(312)782-7565

LOS ANGELES
Jim Richardson
District Manager
Bob Hubbard
Account Manager
Kathie Knox
Account Coordinator
COMPUTERWORLD
3420 Ocean Park Boulevard
Suite 3020
Santa Monica, Calif. 90405
Phone: (213) 450-7181

SAN FRANCISCO
William J. Healey
Western Regional Director
Barry G. Millione
Account Manager
Ruth Gordon
Account Coordinator
COMPUTERWORLD
953 Sacramento Street
Suite 600
San Francisco, Calif. 94111
Phone: (415) 421-7330

JAPAN
Mr. Shigeru Takahashi
General Manager
DEMPA/COMPUTERWORLD
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo 141
Phone: (03) 445-6101
Telex: J2424461

UNITED KINGDOM
Steve Burton
IDG PUBLISHING LTD.
140-146 Camden Street
London NW1 9PF
Phone: (01) 267-1201
Telex: UK-264737
Euan C. Ross
BEERE, HOBSON ASSOCIATES
34 Warwickshire Kenilworth
Warwickshire, CV8 1HE
Phone: (0926) 57819
Telex: UK-311951

WEST GERMANY
CW PUBLIKATIONEN
Friedrichstrasse 31
8000 Munich 40
Phone: (089) 34-80-61
Telex: W.Ger-5-215350-HKFD

AUSTRALIA
Alan Power
COMPUTERWORLD PTY. LTD
37-43 Alexander St.
Crows Nest, NSW 2065
Phone: (02) 439-5133
Telex: SECCO AA25468

BRAZIL
Eric Hippeau
COMPUTERWORLD do BRAZIL
Servicos e Publicacoes Ltda.
Rua Alcindo Guanabara
25/10th floor
20031 Rio de Janeiro, RJ
Phone: (021) 242-7385
Telex: 11-33017 (WORD BR)

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, FEBRUARY 13, 1980

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1979-80 RANGE (1)	CLOSE FEB 13 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	17- 60	29 1/8	- 1/8	-0.4
N	BURROUGHS CORP	59- 81	77 3/4	- 1/2	-0.6
O	COMPUTER AUTOMATION	9- 26	26 1/4	+1	+0.1
N	CONTROL DATA CORP	63- 91	91	+ 1/8	+0.2
O	CRAY RESEARCH INC	8- 58	57 1/2	+4 1/2	+8.4
N	DATA GENERAL CORP	42- 74	65 5/8	+3 3/4	+6.0
N	DATAPOINT CORP	34-110	110 1/8	+7 1/8	+6.6
N	DIGITAL EQUIPMENT	40- 78	78 5/8	+4 7/8	+6.0
N	ELECTRONIC ASSOC.	4- 13	10 1/8	- 1/4	-2.0
A	ELECTRONIC ENGINEER.	9- 18	14 1/2	0	0.0
N	FOUR-PHASE SYSTEMS	10- 47	37 7/8	+4 1/8	+14.7
N	FOXBORO	28- 44	41 3/4	+ 3/8	+9.0
O	GENERAL AUTOMATION	7- 20	17 1/2	- 7/8	-4.7
O	GRI COMPUTER CORP	1- 0	5/8	0	0.0
N	HEWLETT-PACKARD CO	20- 70	60 5/8	+2 3/8	+0.0
N	HONEYWELL INC	42- 92	91 1/4	+1 3/4	+1.0
N	IBM	62-321	60 3/8	+1	+1.6
O	MANAGEMENT ASSIST	9- 29	29 1/4	+3 1/4	+10.1
O	MANUFACTURING DATA S	9- 34	33 3/4	+1	+0.0
O	MINI-COMPUTER SYST	2- 8	8	- 1/8	-2.4
O	MODULAR COMPUTER SYS	7- 18	13 5/8	+1 3/8	+11.2
N	NCR	57- 81	79 3/4	+0 3/4	+6.0
N	PRIME COMPUTER INC	9- 29	26	0	0.0
N	PERKIN-ELMER	17- 41	46 1/2	-2 1/8	-4.7
N	SPERRY RAND	32- 60	57 1/4	- 3/4	-1.0
A	SYSTEMS ENG. LABS	13- 34	30 5/8	-1	-4.0
O	TANDEM COMPUTERS INC	13- 54	54 1/4	+2 1/4	+4.3
A	WANG LABS.	6- 60	29 1/2	+ 3/8	+0.0

LEASING COMPANIES

EXCH		1979-80 RANGE (1)	CLOSE FEB 13 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	13- 21	18 1/2	- 1/8	-1.0
O	COMDISCO INC	3- 21	14 1/2	-1	-6.4
A	COMMERCE GROUP CORP	7- 1	1 1/8	+ 5/8	+125.0
A	COMPUTER INVSTRS GRP	1- 7	0	- 5/8	-17.0
O	CONTINENTAL INFO SYS	3- 10	8 3/4	0	0.0
N	DATRONIC RENTAL	1- 4	2 3/8	0	0.0
A	DCL INC	3- 0	5 1/4	0	0.0
N	DPF INC	7- 16	7 1/4	+ 1/8	+1.7
N	ITEL	6- 35	4 1/2	- 1/4	-5.2
N	LEASCO CORP	24- 60	64	+7 1/2	+10.0
O	LEASPAC CORP	1- 4	1/8	0	0.0
A	PIONEER TEA CORP	4- 7	3 5/8	0	0.0
O	U.S. LEASING	16- 28	18	-1 1/8	-7.0

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		1979-80 RANGE (1)	CLOSE FEB 13 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 0	1	0	0.0
O	ANACOMP INC	8- 34	29	- 1/4	-1.2
O	ANALYSTS INTL CORP	3- 0	8 3/4	0	0.0
A	APPLIED DATA RES.	6- 11	10 5/8	+ 5/8	+5.2
N	AUTOMATIC DATA PROC	26- 40	38 1/4	- 5/8	-1.0
O	COMPU-SERV NETWORK	5- 10	10 1/4	+ 1/2	-2.0
O	COMPUTER HORIZONS	1- 0	4	- 1/2	-11.1
O	COMPUTER NETWORK	9- 10	3 1/4	- 3/4	-0.0
N	COMPUTER SCIENCES	6- 34	22 7/4	- 1/2	-2.1
O	COMPUTER TASK GROUP	1- 8	8 1/2	+ 1/2	+6.0
O	COMPUTER USAGE	4- 0	4 3/4	+ 1/4	+5.0
O	COMPUT AUTO REP SVC	6- 10	8 1/4	- 5/8	-0.0
O	COMSHARE	6- 24	10	+ 1/2	+0.0
O	CULLINANE CORP	10- 83	33	+8	+10.0
O	DATA DIMENSIONS INC	1- 8	1 3/4	- 3/8	-6.0
O	DATATAB	1- 4	1 7/8	+ 1/8	+11.7
O	DSI CORP	6- 0	0 1/4	0	0.0
N	ELECTRONIC DATA SYS.	13- 26	26 1/4	+1 3/8	+5.0
O	INSYTE CORP	1- 3	1 5/8	0	0.0
O	IPS COMPUTER MARKET.	2- 3	3 1/4	0	0.0
O	KEANE ASSOCIATES	3- 0	8 1/2	+ 3/4	+0.0
O	KEYDATA CORP	1- 0	4 7/8	0	0.0
A	LOGICON	10- 23	22	0	0.0
N	NATIONAL DATA CORP	7- 10	10	+ 1/4	+7.4
N	PLANNING RESEARCH	6- 10	8 1/8	+ 3/8	+4.0
O	PROGRAMMED TAX SYSTS	3- 0	0	0	0.0
O	PROGRAMMING & SYS	1- 1	7/8	0	0.0
O	RAPIDATA INC	3- 7	8 1/2	- 1/8	-2.0
O	REYNOLDS & REYNOLDS	10- 36	29 3/4	+0 1/4	+0.1
O	SCIENTIFIC COMPUTERS	3- 10	10 3/4	- 1/2	-3.0
O	TYMSHARE INC	10- 50	35 3/4	+0 3/8	+6.4
N	UPS SYSTEMS	5- 11	11 3/8	+1 1/8	+10.0
O	WYLY CORP	1- 0	8 1/4	+ 1/8	+1.5

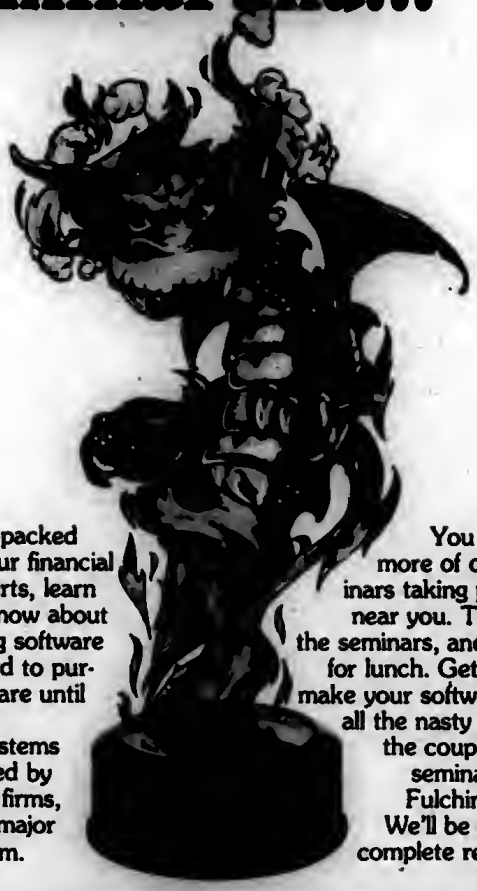
PERIPHERALS & SUBSYSTEMS

EXCH		1979-80 RANGE (1)	CLOSE FEB 13 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	AM INTERNATIONAL	14- 32	17 3/4	- 5/8	-3.4
N	AMPEX CORP	16- 22	20 1/8	+ 1/8	+1.2
O	ANDERSON JACOBSON	3- 10	10 3/4	+1 3/8	+0.0
N	APPLIED DIG DATA SYS	6- 22	4 7/8	+ 1/8	+1.4
O	AUTO-TROL TECHNOLOGY	10- 30	36 1/2	+ 1/2	+1.3
O	BEEHIVE INTL	3- 0	7 3/4	+2 3/8	+44.1
A	BOLT,BERANEK & NEW	8- 22	21 1/2	+1 1/2	+7.0
A	BUNKER-RAMO	10- 32	29 3/4	+ 3/8	+1.2
O	CAMBRIDGE MEMORIES	1- 0	2 5/8	- 3/8	-10.0
O	COMPUTER DEVICES INC	6- 0	4	- 3/4	-6.0
N	CENTRONICS DATA COMP	10- 64	37 1/4	-2	-5.0
O	COGNITRONICS	1- 4	3 1/4	+ 1/8	+4.0
O	COMPUTER COMMUN.	6- 10	8 3/4	+ 1/8	+2.0
O	COMPUTER CONSOLES	6- 81	22 3/4	0	0.0
A	COMPUTER EQUIPMENT	4- 7	6 1/2	0	0.0
O	COMPUTER TRANSCEIVER	1- 0	3 1/8	- 1/8	-3.7
O	COMPUTERVISION CORP	3- 50	51 3/8	+5 3/8	+10.3
N	CONRAC CORP	14- 26	26 1/8	+0 1/4	+10.0
A	DATA ACCESS SYSTEMS	6- 10	11 5/8	+1 7/8	+19.0
A	DATA PRODUCTS CORP	13- 29	22 3/8	- 1/8	-0.0
O	DATUM INC	2- 8	8 1/2	- 1/2	-16.0
O	DECISION DATA COMPUT	2- 8	0 3/4	- 1/4	-0.3
O	DELTA DATA SYSTEMS	1- 0	3 1/8	+ 3/4	+31.0
O	DOCUMATION INC	6- 34	13 1/8	- 3/8	-2.7
O	DATARAM CORP	6- 36	34	-1 3/4	-4.0
O	ELECTRONIC M & M	3- 0	0 5/8	- 1/4	+0.0
O	EVANS & SUTHERLAND	20- 50	50	+0 1/2	+1.0
O	FABRI-TEK	1- 0	0 1/4	+ 1/8	+43.0
O	GENERAL COMPUTER SYS	1- 0	0 1/4	+ 1/8	+0.0
O	GENERAL DATACOMM IND	9- 34	19 3/4	+1 1/4	+0.0
A	HAZELTINE CORP	10- 29	25 1/2	- 1/4	-0.0
N	HARRIS CORP	11- 30	38 1/8	+1 5/8	+4.4
O	INFOREX INC	1- 11	1 5/8	- 3/8	-10.7
O	INFORMATION INTL INC	7- 18	14 1/4	+ 1/2	+0.4
O	INFOTON	1- 0	7 1/8	- 1/4	-1.4
O	INTEL CORP	28- 74	74	+5	+7.0
O	INTERSIL	1- 32	28 3/4	- 1/4	-0.0
A	LUNDY ELECTRONICS	4- 11	0 1/8	- 1/8	-2.4
O	MSI DATA CORP	6- 19	10 5/8	+1 1/4	+13.0
N	MEMOREX	11- 50	17 1/4	- 3/4	-4.1
O	MOHAWK DATA SCI	6- 10	10 1/2	- 3/8	-1.0
O	[illegible]	2- 0	0	0	0.0
O	PARADYNE CORP	9- 33	37	+0 3/4	+10.0
A	[illegible] CORP	3- 10	14	+ 1/8	+1.0
A	POTTER INSTRUMENT	4- 0	1 3/4	0	0.0
O	QANTEX CORP	7- 18	16 1/4	0	0.0
O	RECOGNITION EQUIP	5- 13	10 1/2	+ 1/8	+7.2
O	SCAN DATA	1- 5	0 1/8	+ 1/8	+4.0
O	STORAGE TECHNOLOGY	14- 44	18 3/4	- 1/8	-0.0
O	SYKES DATATRONICS	6- 29	20	+1	+0.5
N	T BAR INC	17- 27	26 1/4	+1	+0.0
A	TEC INC	6- 13	0 1/8	0	0.0
N	TEKTRONIX INC	33- 64	61 7/4	+ 3/4	+1.2
O	TELEX	4- 0	4 5/8	- 1/2	-9.1
O	TESDATA SYSTEMS CP	6- 26	14 1/4	0	0.0
O	TIMEPLEX INC	6- 14	11 7/8	- 1/8	-0.0
O	WILTEK INC	1- 2	3/4	0	0.0

SUPPLIES & ACCESSORIES

EXCH		1979-80 RANGE (1)	CLOSE FEB 13 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 12	10 3/4	0	0.0
O	BALTIMORE BUS FORMS	1- 4	1	0	0.0
O	BARRY WRIGHT	16- 34	27 1/8	+1	+3.0
O	CYBERMATICS INC	1- 1	3/4	- 1/4	-25.0
O	DUPLEX PRODUCTS INC	13- 31	27 3/4	+3 5/8	+0.0
N	ENNIS BUS. FORMS	9- 01	15 7/8	- 7/8	-5.2
N	3M COMPANY	45- 66	63 7/8	+0 5/8	+7.2
O	MOORE CORP LTD	20- 34	31 3/4	0	0.0
O	NASHUA CORP	16- 37	30 5/8	- 7/8	-2.1
O	STANDARD REGISTER	20- 78	27	-1	-0.0
O	TAB PRODUCTS CO	6- 20	22	0	0.0
O	WABASH MAGNETICS	16- 22	13 7/8	- 1/8	-1.7
O	WALLACE BUS FORMS	18- 33	29 1/4	- 3/8	-1.2

Attend a free McCormack & Dodge seminar and...



In a series of information-packed seminars conducted by our financial and data processing experts, learn everything you need to know about state-of-the-art accounting software packages. You can't afford to purchase new financial software until you've checked out ours. McCormack & Dodge systems have already been checked by the 'big eight' accounting firms, the IRS and by over 850 major companies now using them.

You can enroll in one or more of our six product seminars taking place in a major city near you. There's no charge for the seminars, and you'll be our guest for lunch. Get the facts needed to make your software decisions. Avoid all the nasty surprises. Just send the coupon below or call our seminar coordinator, Gina Fulchino at (617) 449-4012. We'll be pleased to send you complete registration materials.

Learn about the financial software that's not full of nasty surprises.

Seminar Schedule

UNITED STATES

February 21 BOSTON
February 26 LOUISVILLE
February 27 MINNEAPOLIS
February 28 ST. LOUIS
March 4 BUFFALO
March 5 INDIANAPOLIS
March 12 LOS ANGELES
March 13 KANSAS CITY
March 18 SAN FRANCISCO
March 20 DETROIT
March 20 PHILADELPHIA
March 21 DENVER
April 8 HOUSTON
April 9 JACKSONVILLE
April 10 NEWARK
April 15 ATLANTA
April 17 COLUMBUS
April 22 STAMFORD
April 29 DALLAS
April 30 NASHVILLE
May 1 CHICAGO
May 6 WASHINGTON, D.C.
May 8 SEATTLE
May 13 PITTSBURGH
May 15 LOS ANGELES

CANADA

February 26 TORONTO
March 27 MONTREAL
April 17 OTTAWA
April 24 CALGARY
May 13 VANCOUVER

Seminars Available:

CW1/14/80

- General Ledger/Financial Analysis System
- General Ledger Workshop
- Accounts Payable System
- Fixed Asset Analysis & Accounting System
- Capital Project Analysis & Accounting System
- Purchasing Information Management System

☐ Please send me an official registration form and agenda.
☐ I can't attend the seminar but would like more information on _____

Name _____ Title _____
Company _____ Tel. _____
Address _____
City _____ State _____ Zip _____
Computer Hardware _____

McCORMACK & DODGE CORPORATION
560 Hillside Avenue, Needham Heights, MA 02194, (617) 449-4012

Atlanta, Chicago, Dallas, Los Angeles, Phoenix, Toronto, Washington, D.C.
United Kingdom/Netherlands • RTZ Computer Services, London — Australia/New Zealand • Adaps Software Ltd., Melbourne, Sydney
Italy • General Systems S.p.A., Milano, Torino